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ABSTRACT

The results of the 1977 survey of doctorate recipients, conducted by the National Research Council, are summarized. The analyses pertain to over 361,000 scientists, engineers, and humanists who earned doctorates in 1934-1976 and who resided in the United States in February 1977. The sample was 79,400 Ph.D.'s. Extensive data are given about the employment status and employment fields of the doctorate holders, and about the number in educational institutions, the distribution by sex and minority group and salaries. (HSE)

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SCIENCE, ENGINEERING, AND HUMANITIES DOCTORATES IN THE UNITED STATES

1977 PROFILE

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SCIENCE, ENGINEERING, AND HUMANITIES DOCTORATES IN THE UNITED STATES

1977 PROFILE

Based on the
1977 Survey of
Science, Engineering, and Humanities Doctorates

The Survey of Doctorate Recipients is conducted by
the National Research Council with the support of
the National Science Foundation, the National Endowment for
the Humanities, and the National Institutes of Health

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Commission on Human Resources
NATIONAL RESEARCH COUNCIL

NATIONAL ACADEMY OF SCIENCES
Washington, D.C.
1978

NOTICE: This report is based on the 1977 Survey of Science, Engineering, and Humanities Doctorates, a project approved by the Governing Board of the National Research Council, whose members are drawn from the Councils of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine. The survey project is part of the program of the Commission on Human Resources.

The Commission on Human Resources has reviewed this report in accordance with procedures approved by a Report Review Committee consisting of members of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine.

FOR FURTHER INFORMATION

Further analyses of the 1977 survey data will be done in 1978, and additional reports will be forthcoming. Meanwhile, questions may be directed to:

Comprehensive Survey Project
Commission on Human Resources
National Research Council
2101 Constitution Avenue
Washington, D.C. 20418

Other reports of the Commission on Human Resources derived from the 1973 and/or 1975 survey data are listed below:

"Doctoral Scientists and Engineers in the United States: 1973 Profile." (March, 1974)

"Field Mobility of Doctoral Scientists and Engineers." (December, 1975)

"An Evaluation of the 1973 Survey of Doctoral Scientists and Engineers." (December, 1976)

"Employment Status of Ph.D. Scientists and Engineers: 1973 and 1975." (December, 1976)

"Doctoral Scientists and Engineers in the United States: 1975 Profile." (December, 1976)

The following reports,* published by the National Science Foundation, are also based on the 1973 and/or 1975 surveys:

"Characteristics of Doctoral Scientists and Engineers in the United States: 1973."

"Characteristics of Doctoral Scientists and Engineers in the United States: 1975."

"Work Activities of Employed Scientists and Engineers in the U.S. Labor Force, July 1973," *Reviews of Data on Science Resources.* (June, 1975)

"Doctoral Scientists and Engineers in Private Industry, 1973," *Reviews of Data on Science Resources.* (April, 1976)

*Available from the U.S. Government Printing Office.

ACKNOWLEDGMENTS

The 1977 Profile report was prepared for the National Science Foundation under the auspices of the Commission on Human Resources of the National Research Council. Support for the project was provided by the National Science Foundation and the National Endowment for the Humanities. Augmentation and maintenance of the survey sample in the biomedical sciences was made possible by support from the National Institutes of Health.

The Comprehensive Survey of Doctorate Recipients is under the administrative supervision of Betty D. Maxfield. Nancy Ahern, Research Associate; Andrew Spisak, Research Associate; and Betty Maxfield, Project Director were responsible for the writing of the report. Doris Rogowski of the CHR Supporting Services Office supervised the coding of the questionnaires, and Herbert Soldz, George Boyce, and Edward J. Finan of the CHR Data Processing Office supervised and performed the data processing activities associated with the survey. Benjamin Tepping, statistical consultant to the project, provided advice concerning the survey design and sampling error calculations. William C. Kelly, Director of the Commission on Human Resources, provided administrative assistance and, along with members of the Commission on Human Resources, provided policy guidance to the staff. Lyle V. Jones, Roy Radner, and Dael L. Wolfle of the Commission contributed by providing careful reviews of the report.

J. James Brown of the National Science Foundation's Division of Science Resources Studies served as the responsible staff officer at the Foundation and, with Stanley Turesky of the National Endowment for the Humanities and William Copeland of the National Institutes of Health, provided assistance and helpful advice to the Comprehensive Survey staff.

Many members of the scientific and engineering communities provided assistance in obtaining current mailing addresses for the survey sample. They include representatives of the professional societies, graduate deans, academic department chairmen and other university officials, and heads of industrial research departments and national laboratories.

Finally, the doctorate-holding scientists, engineers, and humanists who responded to this survey deserve thanks for their cooperation. It was their efforts and responsiveness that made the survey and this report possible.

Betty D. Maxfield
Director
Comprehensive Survey
of Doctorate Recipients

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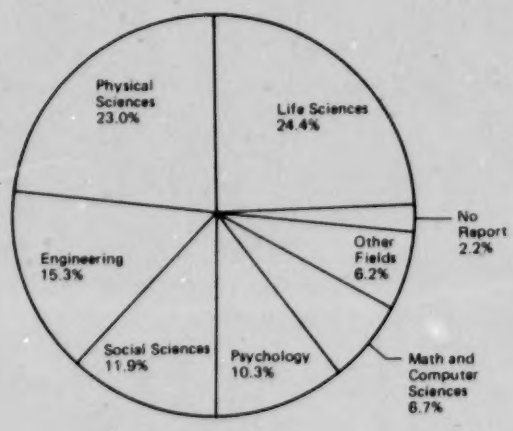
SUMMARY

This summary is based on the results of the 1977 Survey of Doctorate Recipients conducted by the National Research Council. The analyses pertain to 361,300 scientists, engineers, and humanists who earned doctorates within the 42-year period 1934-1976 and who were residing in the United States in February 1977.

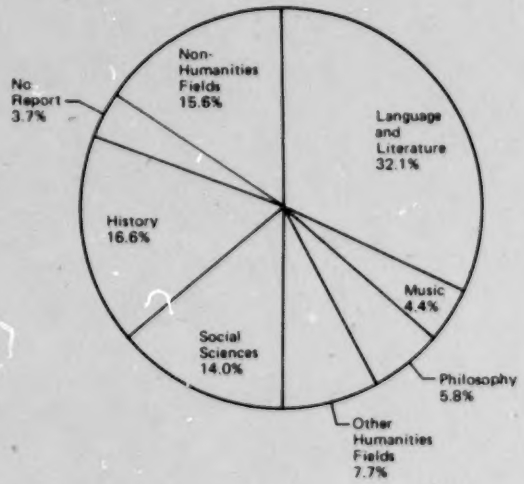
Based on the survey of a sample of 79,400 Ph.D.'s, the total population of Ph.D. scientists and engineers in the United States in 1977 who had received their degrees between January 1934 and July 1976 was estimated to be 295,800, of whom 280,200 were in the labor force. The equivalent figures for the humanities were 79,200 in the population* and 73,100 in the labor force.

- Approximately 276,900 Ph.D. scientists and engineers were employed in February 1977: 260,100 (93.9 percent) full-time; 7,100 (2.6 percent) part-time; and 9,700 (3.5 percent) on postdoctoral appointments.
- Approximately 70,900 Ph.D.'s in the humanities were employed in February 1977: 66,500 (93.8 percent) full-time; 3,600 (5.1 percent) part-time; and 800 (1.1 percent) on postdoctoral appointments.

1977 Employment Fields for Science and Engineering Ph.D.'s

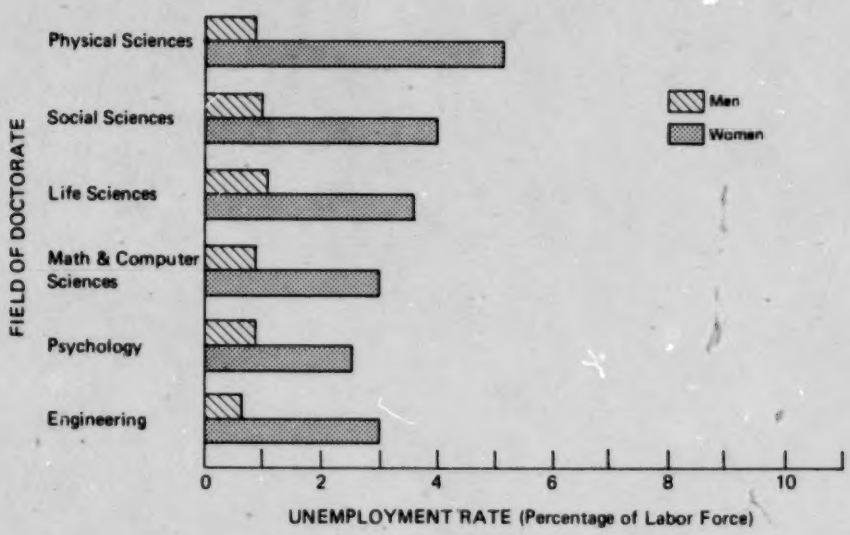


1977 Employment Fields for Humanities Ph.D.'s

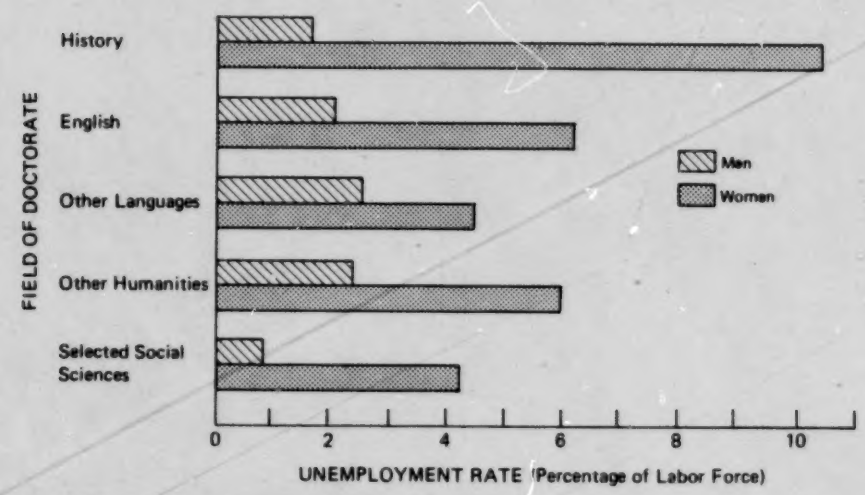


* The humanities estimates include 13,700 Ph.D.'s in the fields of archeology, linguistics, area studies, political science, public administration, and international relations. These selected social science fields are also included in the science/engineering estimates.

- An estimated 3,300 Ph.D.'s in science and engineering were unemployed and seeking employment in February 1977, yielding an unemployment rate of 1.2 percent of the labor force.
- An estimated 2,100 Ph.D.'s in the humanities were unemployed and seeking employment in February 1977, yielding an unemployment rate of 2.9 percent of the labor force.

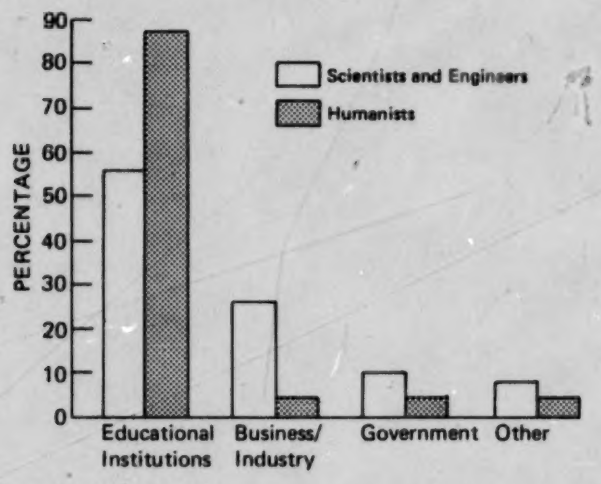


Unemployment Rates for Ph.D.'s in Science and Engineering, 1977



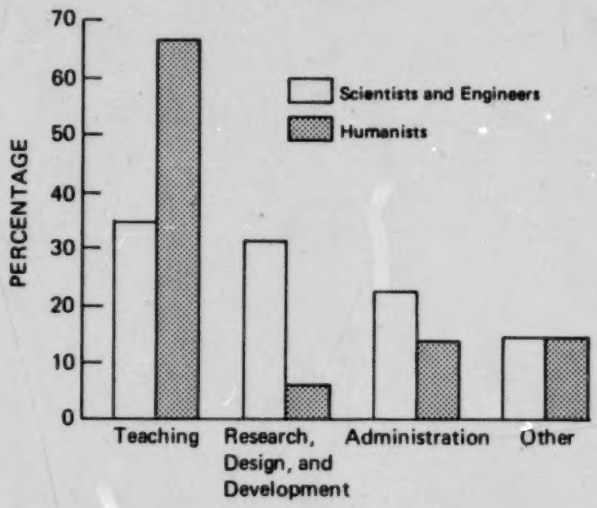
Unemployment Rates for Ph.D.'s in the Humanities, 1977

- Excluding postdoctoral appointees, educational institutions employed 56 percent of the working doctoral scientists and engineers and 88 percent of the employed Ph.D.'s in the humanities.



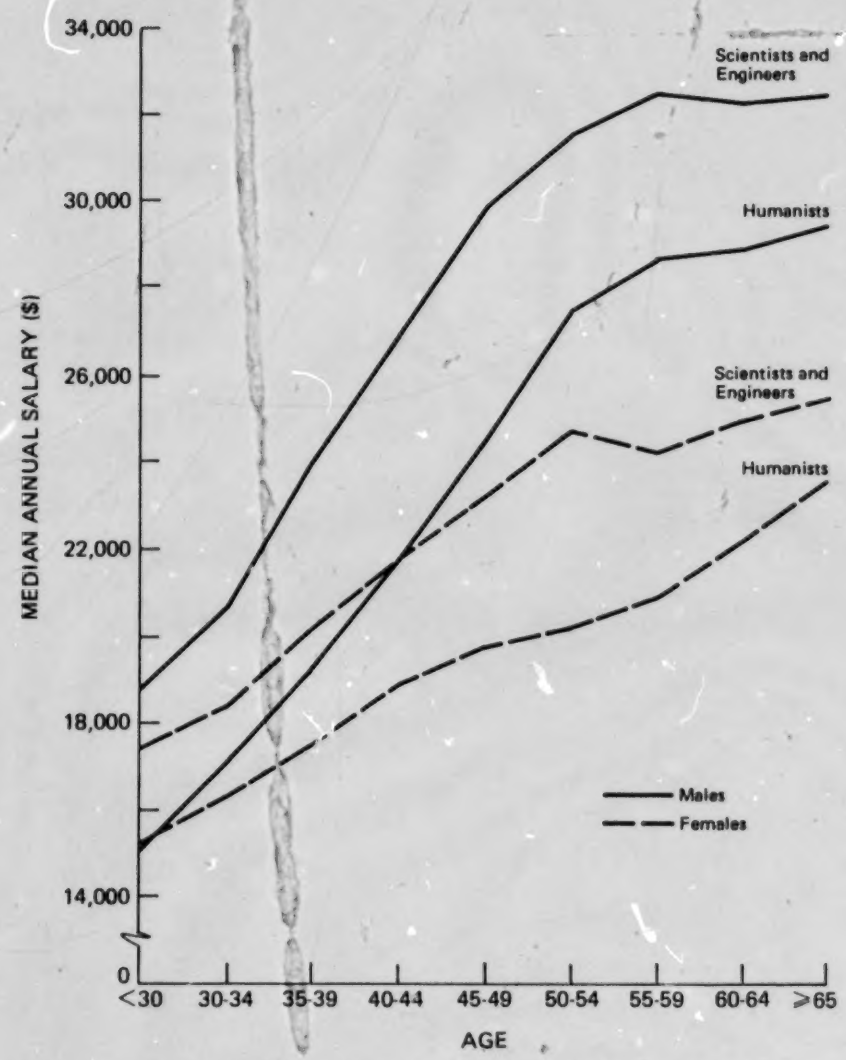
Distribution of Employed Doctoral Scientists, Engineers, and Humanists by Type of Employer (Excluding Postdoctoral Appointees), 1977

- Approximately two-thirds of the employed Ph.D.'s in the humanities were engaged primarily in teaching, compared with only one-third of the science and engineering Ph.D.'s.



Distribution of Employed Doctoral Scientists, Engineers, and Humanists by Primary Work Activity (Excluding Postdoctoral Appointees), 1977

- The median annual salary for science and engineering Ph.D.'s was $25,600, with men receiving $26,000 and women earning $20,700 as median salaries.
- Ph.D.'s in the humanities earned a median annual salary of $21,000 in 1977, with men and women earning $22,100 and $18,300, respectively.



Median Annual Salaries of Doctorate Recipients by Age and Sex, 1977

- Only 10 percent, or 30,500, of the science and engineering doctoral population were women, with the field of psychology having the largest proportion (24 percent) of women. Nearly 22 percent, or 17,300 of the humanities Ph.D.'s were female, with art history attracting the largest percentage (41 percent) of women.

- Members of racial minority groups numbered 19,000 and accounted for 6 percent of the total population of doctorate recipients in science and engineering, and 2,500, or 3 percent, of the humanities doctoral population.

- A large proportion of the doctoral labor force received their degrees in the 1970's: 38 percent of the science and engineering doctorates and 44 percent of the humanities doctorates.

- Although increasing in numbers, the U.S. doctoral science and engineering population changed little between 1973 and 1977 in terms of employment status by field of Ph.D.

INTRODUCTION

This is the third report on biennial surveys of the characteristics of the nation's doctorate recipients, and the first report to include Ph.D.'s in the humanities as well as doctorate-level scientists[1] and engineers. This report is based on the results of a survey conducted in the spring of 1977 by the National Academy of Sciences-National Research Council (NAS-NRC) under the sponsorship of the National Science Foundation (NSF), the National Endowment for the Humanities (NEH), and the National Institutes of Health (NIH). The survey, which was based on a roster of Ph.D.'s in science, engineering, and the humanities, is one of three sources of information about the scientific and engineering population of the United States that the National Science Foundation has been developing as part of its Manpower Characteristics System.

This report focuses primarily on the employment status and characteristics of 1934-1976 Ph.D.'s in science, engineering, and the humanities who were residing in the United States in February 1977. Chapter I consists of analyses of doctorates in the sciences and engineering; Chapter II presents analyses of Ph.D.'s in the humanities and selected social science fields. With the exception of two longitudinal tables which are shown for the science and engineering doctorates only, Chapters I and II are parallel chapters. The science/engineering Ph.D. fields include mathematics; physics/astronomy; chemistry; earth, environmental, and marine sciences; engineering; life sciences (agricultural, medical, and biological); psychology; and social sciences (including all social science fine fields listed in Appendix A). Chapter II fields encompass not only humanities, such as languages and literature, but also selected social science fields (i.e., archeology, linguistics, area studies, political science, public administration, and international relations). The selected social science fields are included in <u>both</u> Chapter I (science/engineering) and Chapter II (humanities).

---

[1] Throughout this study the population of doctorate-holding scientists was defined to include those with doctorates in the natural and social sciences, and mathematics. A detailed list of fields included appears as part of the survey questionnaire reproduced in Appendix A.

Additional analyses of science and engineering doctorates employed in industry, career patterns of Ph.D.'s in science and engineering, and a more detailed report on the employment status of humanities doctorates are planned for 1978. The results of these studies will be reported in later publications.

The Sampling Frame[2]

The 1977 roster of science, engineering, and humanities doctorates, compiled by the National Research Council, contains data on 402,383 individuals. The roster consists of scientists and engineers who earned doctorates within the 42-year period 1934-1976, and humanists who earned Ph.D.'s within the period 1930-1976. More specifically, the population contains three groups:

Segment 1- Those individuals recorded in the NRC's Doctorate Records File, a virtually complete file of U.S. research doctorates, in the natural or social sciences, mathematics, engineering, and the humanities, but excluding individuals who were foreign citizens and who, at the time they received the degree, indicated in the NRC's Survey of Earned Doctorates that they intended to leave the United States after receiving their degrees.

Segment 2- Individuals, recorded in the NRC's Doctorate Records File, who earned their doctorates at U.S. institutions in education or professional fields and who were known to have been subsequently employed as scientists or engineers according to the NSF's National Register of Scientific Personnel (1968-1970), Engineer Register (1967-1969), or Employment Survey (1971).

Segment 3- Individuals who earned their doctorates at foreign institutions and were known to be working in the U.S. as scientists or engineers according to a number of sources such as American Men and Women of Science, the NSF's National Register of Scientific and Technical Personnel, federal laboratories, selected large industrial companies, and college and university catalogues of doctorate-granting institutions.

[2] A detailed explanation of the sampling frame is provided in Appendix B.

Sample Selection

The sampling frame was highly stratified, with a total of 2,501 strata. The sample was stratified by field of doctorate or field of science/engineering employment, the year in which the doctoral degree was awarded, degree category (i.e., U.S. doctorates in the sciences, engineering, and the humanities; U.S. doctorates in education or professional fields working in science or engineering; and doctorates from foreign institutions who were employed as scientists or engineers), sex, and race/ethnic group. A sampling rate was set for each stratum, varying from 7 to 100 percent, in order to provide sufficiently large samples for certain subgroups of the population. Within each stratum, a simple random sample was selected. The sample sizes for the five stratification categories are shown in Table C.1 of Appendix C. The 1977 sample consisted of 83,546 individuals, of whom 61,711 were also in the 1975 sample. Thus, the overall sampling rate, from a roster of 402,383 Ph.D.'s, was 21 percent.

Survey Procedure

Out of a total sample of 83,546 individuals, 4,171 persons were known to be deceased or out-of-scope[3] prior to the survey and were therefore excluded from the survey. Thus, the survey sample consisted of 79,375 individuals.

Addresses were obtained for 93 percent of the survey sample. The address sources included the Doctorate Records File (NRC), the National Register of Scientific and Technical Personnel (NSF), American Men and Women of Science, the National Faculty Directory, college and university catalogues, and responses from previous surveys, as well as many alumni offices, departments of individuals' baccalaureate and doctoral institutions, and several professional societies.

The initial mailing of the 1977 survey was conducted in March 1977. One follow-up mailing to those who had not yet responded took place in April 1977. The data in this report are based on responses received through November 1977.

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[3] Those individuals who were out-of-scope are described in Appendix D, Table D.1.

Response Rates

Responses were defined to include not only individuals who completed questionnaires, but also individuals found to be deceased in the 1977 survey.

Information was collected on 50,648 of the 79,375 individuals in the survey sample, yielding a response rate of 64 percent. The response rate, when calculated on the basis of those in the sample who were contacted (73,698), is 69 percent.[4]

Weighting of Responses

Estimates in this report were made by weighting the responses received. The 4,171 individuals in the total sample of 83,546 who were known to be deceased or out-of-scope prior to the survey were excluded from the survey and weighted by sample weights (i.e., the ratio of a stratum's population size to its sample size).

The responses received from the survey sample (50,648) were weighted by the product of the weight for nonresponse and the sample weight. The weight for nonresponse is the ratio of the number of survey sample cases in the stratum to the number of responses in the stratum. The weighting procedure is illustrated by the following:

Number of responses	x	Weights for nonresponse	=	Survey sample size (79,375)	x	Sample weights	=	Estimated population size using all responses (387,102)[5]
				Those excluded from survey sample (4,171)	x	Sample weights	=	Estimated population size for excluded cases (15,281)
				Total Sample size (83,546)				Estimated total population (402,383)

The weighting procedures are described in greater detail in Appendix D.

[4] See Appendix C for detailed response rates for the 1977, 1975, and 1973 surveys.

[5] This figure is higher than the population estimates in Chapters I and II since it includes responses received from individuals residing in foreign countries, those known to be deceased in the 1977 survey, and those with doctorates in education or professional fields--all of whom are out-of-scope for this report.

Responses Included in Analyses

The analyses in this report are based on individuals who earned doctorates in the sciences, engineering, and the humanities within the period January 1934 through June 1976 and who were residing in the United States in February 1977. Excluded from the analyses are those Ph.D.'s who are deceased, those with doctorates in education or professional fields who were working in science (see description of "Segment 2" on page), those with humanities doctorates in 1930-1933, and those who were residing in foreign countries.

Sources of Error

The estimates in this report are subject to two types of errors--sampling and nonsampling. The sampling error or standard error is a measure of the precision with which an estimate based on the survey sample approximates the average result of all possible samples of equal size. Each statistic cited in the text of this report is accompanied by its estimated sampling error.[6]

The sampling error allows the reader to construct a "confidence interval" for a given statistic. The interval from *one* standard error below the estimate to *one* standard error above the estimate is a 2/3 confidence interval; thus, with 67 percent confidence the true value is within this range. The interval from *two* standard errors below the estimate to *two* standard errors above the estimate is a 95 percent confidence interval. For example, the estimated unemployment rate for doctoral scientists and engineers is 1.2 ± 0.1 percent. With 95 percent confidence, we can say that the actual rate lies within the range from 1.0 to 1.2 percent [1.2 minus 2(0.1), to 1.2 plus 2(0.1)].

Nonsampling errors may arise from a number of sources, e.g., misinterpretation of questions, errors in coding and processing, and nonresponse bias.[7] The total error may thus be larger than the estimated sampling errors shown.

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[6] A discussion of sampling errors is provided in Appendix E.

[7] A study is currently being conducted to determine if significant nonresponse bias exists in the NRC's employment data (i.e., employment status, employment field, primary work activity, and type of employer).

CHAPTER 1

SCIENCE AND ENGINEERING

DOCTORAL POPULATION BY FIELDS

For purposes of this report, individuals in the sample are classified either by field of Ph.D. degree or by field of employment. Chapter I is restricted to a discussion of those individuals with Ph.D.'s in the sciences or engineering, while Chapter II is confined to Ph.D.'s in the humanities and selected social science fields. Field of doctorate for Chapter I is defined as 1 of 11 broad fields included in the specialties list of Appendix A, i.e., mathematics, computer sciences, physics/astronomy, chemistry, earth sciences, engineering, agricultural sciences, medical sciences, biological sciences, psychology, and social sciences.

Fields of employment are defined in terms of these same broad fields. The field of employment data, unless otherwise stated, include Ph.D.'s who are on postdoctoral appointments as well as Ph.D.'s who are employed full-time and part-time; retired and unemployed persons are excluded. Table 1.1 gives the distribution of 1934-1976 doctoral scientists and engineers in the United States by field of doctorate and field of employment as of February 1977. Table 1.1 also gives the percentages of Ph.D.'s by field for those employed in science/engineering only.

TABLE 1.1 Distribution of Doctoral Scientists and Engineers in the United States, 1934-1976 Graduates by Field of Doctorate and Field of Employment, 1977

	Field of Doctorate		Field of Employment		
	N	%	N	% of Total Employed	% of Science-Employed+
All Fields	295,827	100.0	276,910*	100.0	100.0
Mathematics	15,848	5.4	13,130	4.7	5.2
Computer Sciences	1,516	0.5	5,514	2.0	2.2
Physics/Astronomy	26,425	8.9	17,911	6.5	7.1
Chemistry	44,616	15.1	33,236	12.0	13.1
Earth Sciences	9,578	3.2	12,511	4.5	4.9
Engineering	44,329	15.0	42,309	15.3	16.7
Agricultural Sciences	13,612	4.6	13,534	4.9	5.3
Medical Sciences	8,147	2.8	14,785	5.3	5.8
Biological Sciences	53,543	18.1	39,251	14.2	15.5
Psychology	34,177	11.6	28,555	10.3	11.3
Social Sciences	44,031	14.9	32,973	11.9	13.0
Nonscience			17,165	6.2	
No Report			6,036	2.2	

*Includes postdoctoral appointees as well as full-time and part-time employed.

+Percentages are based on the estimated number of individuals employed in science (N = 253,709).

The fields with the largest number of doctorate recipients were the biological sciences (18.1 ± 0.1 percent)[8], chemistry (15.1 ± 0.1 percent), engineering (15.0 ± 0.1 percent), and the social sciences (14.9 ± 0.1 percent). The fields employing the largest percentage of Ph.D. recipients were essentially the same four fields, i.e., engineering (15.3 ± 0.1 percent), biological sciences (14.2 ± 0.1 percent), chemistry (12.0 ± 0.1 percent), and social sciences (11.9 ± 0.1 percent).

The difference between the number of individuals in a doctoral field and the corresponding employment field was large for some fields. In some cases the differences may be attributable to field definition. For example, the fields of mathematics and computer sciences have a great deal in common, and the similarities may account for the net loss from Ph.D. field to employment field for mathematics and the net gain in computer sciences.

The overlapping that occurs in the science fields may account for part of the apparent transition from Ph.D. field to employment field. Appendix F helps to clarify this by giving the estimated number of doctoral scientists and engineers employed in each fine-field category and by showing the fine-field composition of the 11 broad science fields.

With these precautions in mind, comparisons between doctoral and corresponding employment fields show net gains in medical sciences, computer sciences, and earth sciences. The influx into medical sciences may have occurred largely as a result of the net loss in the field of biological sciences. Other fields showing large net losses from number of doctorate recipients to number employed were chemistry, social sciences, and physics/astronomy. A number of Ph.D.'s in the sciences and engineering moved into nonscience employment fields and comprised 6.2 ± 0.1 percent of the employed Ph.D. population. As a generalization, there was a tendency to move from the more "pure" or theoretical fields or subfields to the more "applied" fields of employment.

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[8] The figure, 0.1 percent, is the sampling error associated with the estimate of 18.1 percent. See page 5 for an explanation of sampling error and how it can be converted to a confidence interval.

FIELD MOBILITY OF EMPLOYED PH.D.'S

Of the 295,800 doctoral scientists and engineers in the United States who received their doctorates in the period January 1934 through June 1976 (Table 1.1), approximately 276,900 were employed in February 1977. Table 1.2 shows the movement of individuals with Ph.D.'s in the sciences and engineering from doctorate field to employment field.

TABLE 1.2 Field Mobility of Employed Doctoral Scientists and Engineers, 1977

		Field of Employment												
Field of Doctorate	Total Employed[+]	Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
All Fields	276,910	13,130	5,514	17,911	33,236	12,511	42,309	13,534	14,785	39,251	28,555	32,973	17,165	6,036
Mathematics	14,992	76.4	7.1	0.3	*	0.5	4.6	0.1	0.3	3.2	0.1	0.8	4.7	1.8
Computer Sciences	1,503	6.0	79.4	0.1	0.0	0.0	6.0	0.0	0.0	0.0	0.7	2.5	4.5	0.8
Physics/Astronomy	25,076	1.7	3.5	61.8	1.2	4.6	14.7	0.2	1.2	1.8	*	0.7	6.2	2.4
Chemistry	41,185	0.2	0.7	1.9	71.5	2.4	5.9	0.6	3.0	3.8	0.1	0.3	7.1	2.5
Earth Sciences	9,102	0.3	0.2	1.2	0.4	85.5	2.9	0.4	1.4	2.0	0.1	0.6	3.4	1.6
Engineering	42,808	1.3	4.2	2.9	1.2	1.9	80.7	0.2	0.5	0.5	*	0.4	4.2	1.9
Agricultural Sciences	12,856	0.2	0.0	0.0	1.6	2.9	0.4	75.7	1.2	11.0	*	2.1	3.1	1.9
Medical Sciences	7,565	0.0	0.0	0.5	2.6	0.2	0.3	0.5	78.6	10.5	0.4	0.5	3.1	2.9
Biological Sciences	48,692	0.2	0.1	0.3	5.2	2.0	0.5	4.9	11.6	69.0	0.3	0.2	3.4	2.2
Psychology	32,216	0.2	0.3	*	0.0	0.1	0.2	0.1	2.1	1.1	86.6	1.8	5.6	1.9
Social Sciences	40,915	0.7	0.3	0.0	0.1	0.7	0.5	2.2	1.2	0.5	0.9	76.6	13.9	2.5

[+]Includes postdoctoral appointees as well as full-time and part-time employed.
*Less than 0.1 percent.

The Ph.D. fields retaining the highest percentage of their doctorates in the corresponding employment field were psychology (86.6 ± 0.6 percent) and earth sciences (85.5 ± 1.0 percent). The increase in numbers from degree to employment field for earth sciences (Table 1.1) indicates that, in addition to retaining a high percentage of its graduates, the earth sciences field attracted graduates from other Ph.D. fields.

Physics/astronomy retained the smallest percentage of its Ph.D.'s (61.8 ± 0.9 percent). The Ph.D.'s in physics/astronomy who moved out of their field for employment moved most frequently to engineering (14.7 ± 0.7 percent).

The greatest mobility occurred between fields that are closely related, for example, mathematics and computer sciences. Of the mathematicians, 7.1 ± 0.6 percent were employed in computer sciences, while 6.0 ± 1.7 percent of computer science Ph.D.'s were employed in mathematics. This mobility

across fields was especially obvious among the life sciences (agricultural, medical, and biological sciences). Doctorates in the biological sciences were frequently employed in the medical sciences (11.6 ± 0.3 percent); Ph.D.'s in agricultural sciences often switched to biological science employment (11.0 ± 0.9 percent); and 10.5 ± 0.8 percent of the Ph.D.'s in medical sciences moved into the biological sciences.

Engineering had a high employment retention rate of its Ph.D.'s (80.7 ± 0.6 percent). Those who left engineering moved into fields that are closely related to many of the engineering subfields (i.e., mathematics and physical sciences).

DEMOGRAPHIC CHARACTERISTICS BY FIELD OF DOCTORATE

In February 1977, nearly 90 percent of the 1934-1976 doctoral scientists and engineers in the United States were men (Table 1.3). The Ph.D. fields with the highest percentage of men were engineering (99.4 ± <0.1 percent), agricultural sciences (97.9 ± 0.1 percent), and physics/astronomy (97.3 ± 0.1 percent). Although the number of women Ph.D.'s in the sciences and engineering was small in all fields, women were more highly represented in the fields of psychology (23.9 ± 0.1 percent), biological sciences (16.9 ± 0.1 percent), social sciences (14.2 ± 0.1 percent), and medical sciences (13.9 ± 0.4 percent). As noted in the 1975 survey, the field of engineering continued to produce the fewest women doctorate recipients; only 0.6 ± <0.1 percent of all Ph.D.'s in engineering were women.[9]

Racial minority groups (Blacks, American Indians, and Asians) comprised slightly over 6 percent (6.4 ± 0.1 percent) of the doctoral population.[10] Minority group members, like women, were concentrated in certain science fields. The fields with the highest <u>percentages</u> of minority group members were engineering (12.2 ± 0.4 percent), computer sciences (11.0 ± 2.5 percent), and medical sciences (8.8 ± 0.6 percent). However, the largest <u>numbers</u> of

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[9] In 1975, it was estimated that 0.5 percent of the Ph.D.'s in engineering were women (<u>Doctoral Scientists and Engineers in the United States: 1975 Profile</u>, National Academy of Sciences, Washington, D.C., 1976).

[10] It should be noted that these figures may reflect a bias due to the high percentage of nonresponse to the racial/ethnic question.

minorities were in engineering (5,400), biological sciences (3,100), and chemistry (2,900). The smallest proportions of minority group members were found in psychology (2.7 ± 0.2 percent) and earth sciences (3.6 ± 0.4 percent), continuing a pattern observed in the 1975 survey data.[11]

TABLE 1.3 Demographic Characteristics by Field of Science and Engineering Doctorate, 1977

Demographic Characteristics	All Fields	Field of Doctorate										
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc
Total Population	295,827	15,848	1,516	26,425	44,616	9,578	44,329	13,612	8,147	53,548	34,177	44,031
Sex	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	89.7	92.6	93.3	97.3	93.4	96.2	99.4	97.9	86.1	83.1	76.1	85.8
Female	10.3	7.4	6.7	2.7	6.6	3.8	0.6	2.1	13.9	16.9	23.9	14.2
Racial Group	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White/Caucasian	89.1	88.7	83.4	88.4	89.7	93.3	84.1	90.7	87.6	89.9	92.2	89.8
Minority Group	6.4	5.7	11.0	5.7	6.4	3.6	12.2	5.8	8.8	5.9	2.7	5.0
No Report	4.5	5.6	5.5	5.9	3.9	3.0	3.7	3.5	3.7	4.2	5.2	5.2
Age in Survey Year	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 30	3.0	4.5	8.4	2.1	3.3	2.6	2.0	2.1	2.9	3.3	4.4	2.3
30-34	18.5	21.6	44.5	19.2	16.5	17.1	18.2	14.8	17.8	19.4	21.7	16.6
35-39	22.9	27.6	30.1	25.6	20.4	21.0	27.4	19.9	21.9	22.1	20.5	21.4
40-44	15.2	14.7	8.3	16.0	14.5	18.2	19.9	15.8	14.8	13.1	13.9	14.1
45-49	12.7	10.7	4.7	12.2	13.2	14.6	12.4	15.1	13.9	12.1	12.4	13.0
50-54	10.4	8.1	3.2	10.9	10.4	9.6	8.7	10.8	11.6	11.1	11.5	11.2
55-59	7.7	4.9	.6	6.2	9.4	7.8	6.6	10.3	6.7	7.3	7.8	9.1
60-64	4.8	3.8	0.1	3.6	6.7	3.7	2.6	5.9	5.6	5.4	4.0	5.9
Over 64	4.6	4.1	0.0	4.0	5.4	5.4	2.0	5.0	4.4	6.0	3.8	6.0
No Report	0.2	*	0.0	0.1	0.1	*	0.1	0.2	0.3	0.1	0.1	0.3
Calendar Year of Ph.D.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1934-39	2.8	2.5	0.0	2.9	4.9	3.4	1.0	1.9	2.3	3.7	1.7	2.5
1940-44	2.9	2.3	0.0	2.4	5.7	2.2	1.5	2.8	2.6	3.8	1.1	2.3
1945-49	3.2	3.1	0.0	2.9	5.7	3.0	2.0	3.3	2.5	3.5	1.9	2.9
1950-54	8.3	6.7	0.6	9.7	11.3	7.0	6.2	9.4	6.8	8.7	8.0	7.4
1955-59	9.3	7.3	0.9	9.6	11.2	9.6	6.9	10.5	9.2	10.0	10.8	8.3
1960-64	12.8	13.2	4.8	15.0	14.3	14.1	12.6	15.9	11.7	11.9	11.6	11.0
1965-69	22.3	26.0	13.1	24.1	20.5	21.6	28.9	19.6	21.0	21.1	19.8	19.7
1970-74	29.8	30.8	56.6	26.9	21.4	26.5	32.6	28.5	32.9	29.0	32.9	34.8
1975-76#	8.7	8.2	24.0	6.5	4.9	10.6	8.2	8.0	11.0	8.3	12.0	11.0
Citizenship	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U.S.	94.1	93.7	87.3	92.3	93.9	94.1	90.0	94.7	92.5	94.6	98.6	95.5
Foreign##	5.8	6.0	12.7	7.6	6.1	5.9	9.9	5.2	7.2	5.2	1.2	4.1
No Report	0.2	0.3	0.0	0.1	*	*	0.1	0.1	0.3	0.2	0.2	0.4

*Less than 0.1 percent.
+Includes Blacks, American Indians, and Asians.
#Excludes Ph.D's awarded in July-December, 1976.
##In view of the lack of a comprehensive sampling frame for foreign-earned doctorates in the United States, few additions of segment three cases have been made to the sample since the 1973 survey. Therefore, data regarding the U.S. population of doctorates in science and engineering provided in this report may be somewhat underestimated.

[11] In 1975, the percentage of minorities in the fields of psychology and earth sciences were 2.7 and 2.8 percent, respectively (Doctoral Scientists and Engineers in the United States, 1975 Profile).

Although computer sciences had the highest percentage of Ph.D.'s under 30 years of age (8.4 ± 2.3 percent), the fields of biological sciences (1,700), psychology (1,500), and chemistry (1,500) had the largest numbers of doctorate recipients under 30 years of age. Computer sciences had the highest percentage of doctorates under 40 (83.0 ± 3.0 percent), while agricultural sciences, chemistry, earth sciences, and social sciences had high percentages of doctorate recipients over 40 years of age.

Examination of the year the doctorate was awarded provides an indication of the relative growth of the science and engineering fields. Computer sciences, a relatively new Ph.D. field, has shown rapid growth over the past six years (80.6 ± 2.7 percent are in the 1970-1976 cohort). Outside of computer sciences, psychology (12.0 ± 0.3 percent), social sciences (11.0 ± 0.3 percent), medical sciences (11.0 ± 0.4 percent), and earth sciences (10.6 ± 0.6 percent) all had relatively high proportions of recent (1975-1976) Ph.D. graduates. Chemistry had the smallest percentage of new (1975-1976) Ph.D. graduates, with 4.9 ± 0.2 percent.

Both computer sciences and engineering had high percentages of foreign citizens (12.7 ± 2.8 percent and 9.9 ± 0.4 percent, respectively), whereas the field of psychology had as few as 1.2 ± 0.1 percent foreign citizens.

EMPLOYMENT STATUS BY FIELD OF DOCTORATE

Of the 295,800 doctoral scientists and engineers in the United States, approximately 260,100 (87.9 ± 0.2 percent) were employed in full-time jobs (Table 1.4A). An additional 7,100 (2.4 ± 0.1 percent) Ph.D.'s in science and engineering reported that they were employed on a part-time basis, and about 9,700 (3.3 ± 0.1 percent) indicated they held postdoctoral appointments (i.e., fellowship, traineeship, research associateship, internship) in February 1977. An estimated 3,300 Ph.D.'s (1.1 ± 0.1 percent of the total population of science/engineering Ph.D.'s) were unemployed and seeking employment.[12] These four groups (full-time employed, part-time employed, postdoctoral appointees,

[12] The unemployment rate is the percentage of Ph.D.'s who are unemployed and seeking employment to the number in the science/engineering labor force--the ratio of 3,300 to 280,200, or 1.2 percent. Unemployment rates are shown in Table 1.11.

and those unemployed who were seeking employment) constitute the labor force as defined in this report. Those Ph.D.'s who indicated they were not employed and not seeking employment, those who were retired, or those who gave no report of their employment status were considered to be outside the labor force (15,600). Thus, the estimated number in the labor force is 280,200, or 94.7 ± 0.1 percent of the total population of Ph.D. scientists and engineers.

TABLE 1.4A 1977 Employment Status of Doctoral Scientists and Engineers

1977 Employment Status	All Fields	Field of Doctorate										
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc
Total Population	295,827	15,848	1,516	26,425	44,616	9,578	44,329	13,612	8,147	53,548	34,177	44,031
Employed Full-Time	87.9	91.9	99.0	88.4	87.0	90.1	94.6	91.6	85.0	80.7	86.4	89.0
Science	80.6	86.0	93.7	80.8	78.5	85.5	88.9	87.2	79.8	76.0	80.0	74.3
Other/Unknown Field	7.4	5.9	5.3	7.7	8.5	4.5	5.8	4.4	5.2	4.7	6.4	14.2
Employed Part-Time	2.4	1.9	0.1	1.9	1.7	2.0	1.0	1.1	2.4	2.4	5.9	2.9
Science	2.0	1.6	0.1	1.6	1.4	1.8	0.9	0.8	2.1	2.1	5.3	2.0
Other/Unknown Field	0.4	0.3	0.0	0.4	0.3	0.2	0.1	0.3	0.3	0.3	0.5	0.9
Postdoctoral Appointment*	3.3	0.8	0.0	4.5	3.7	3.0	1.0	1.7	5.4	7.8	2.0	1.0
Not Employed**	5.4	4.5	0.9	4.3	6.5	4.6	2.5	4.9	5.6	8.0	4.6	5.8
Seeking Employment	1.1	1.1	0.0	1.1	1.1	1.0	0.6	0.5	1.0	1.6	1.2	1.4
Not Seeking	1.0	0.7	0.9	0.8	1.0	0.2	0.5	0.4	1.5	1.8	1.1	0.7
Retired	3.3	2.7	0.0	2.5	4.4	3.4	1.5	4.0	3.1	4.6	2.3	3.8
Other	0.2	0.2	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3	0.1	0.2
No Report	0.9	0.7	0.0	0.7	1.0	0.2	0.7	0.5	1.3	0.8	1.0	1.1

*The percentages of postdoctorals may be underestimates, since the sources of information about foreign Ph.D.'s who came to the U.S. for postdoctoral study are incomplete.

**Percentages are not unemployment rates, since the percentages presented here are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, all of whom may not be part of the labor force. For unemployment rates, see Table 1.11.

Ph.D.'s in computer sciences reported the highest percentage of full-time science employment (93.7 ± 2.0 percent of the total). Other fields with high percentages of full-time employment in science/engineering were engineering (88.9 ± 0.5 percent), agricultural sciences (87.2 ± 0.8 percent), mathematics (86.0 ± 0.7 percent), and earth sciences (85.5 ± 0.9 percent). Over 90 percent of the doctorate recipients in these fields reported full-time employment in either science or nonscience/unknown fields.

Social scientists and biological scientists reported the lowest percentages in full-time science employment (74.8 ± 0.7 and 76.0 ± 0.4 percent, respectively). Social scientists reported the highest percentage, 14.2 ± 0.5 percent, in nonscience/unknown fields of full-time employment.

For the 1971-1976 Ph.D.'s (103,400), similarities within fields exist for the high and low percentages of full-time and part-time employment. Computer scientists reported the highest percentage in full-time employment (98.9 ± 1.1 percent), and biological scientists reported the lowest percentage (70.9 ± 0.8 percent). Psychology was the field with the highest percentage of part-time employed doctorate holders: 6.9 ± 0.7 percent for recent graduates (Table 1.4B) and 5.9 ± 0.4 percent for the 1934-1976 Ph.D.'s (Table 1.4A).

TABLE 1.4B 1977 Employment Status of Doctoral Scientists and Engineers Receiving Doctorates in 1971-1976

1977 Employment Status	All Fields	Field of Doctorate										
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc
Total Population	103,361	5,485	1,153	7,836	10,322	3,453	16,079	4,538	3,365	18,217	14,288	18,645
Employed Full-Time	85.4	93.0	98.9	80.3	81.2	88.0	95.3	92.5	79.8	70.9	85.2	91.4
Science	79.3	86.8	92.7	73.4	74.9	85.5	91.2	89.4	76.3	67.7	80.6	78.1
Other/Unknown Field	6.1	6.2	6.2	6.9	6.3	2.5	4.1	3.0	3.5	3.2	4.5	13.3
Employed Part-Time	2.5	2.0	0.0	2.0	1.3	1.9	0.7	0.5	3.7	2.0	6.9	2.8
Science	2.2	1.8	0.0	1.5	1.2	1.6	0.7	0.4	2.5	1.9	6.3	2.2
Other/Unknown Field	0.3	0.2	0.0	0.5	0.2	0.3	*	0.1	0.2	0.1	0.6	0.6
Postdoctoral Appointment**	8.5	2.3	0.0	14.2	13.9	8.0	2.4	4.8	12.7	21.0	4.3	1.8
Not Employed†	3.0	2.4	1.1	2.7	3.0	1.8	1.0	1.5	4.0	5.3	3.2	3.1
Seeking Employment	1.7	1.4	0.0	1.6	1.6	1.5	0.5	0.8	1.4	2.3	1.9	2.3
Not Seeking	1.2	0.9	1.1	1.1	1.3	0.2	0.5	0.5	2.4	2.8	1.2	0.8
Retired	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.3	0.2	0.2	0.1	*
Other	0.1	0.1	0.0	0.2	*	0.0	0.0	0.0	0.0	0.2	0.0	0.1
No Report	0.6	0.3	0.0	0.5	0.5	0.3	0.6	0.7	0.7	0.6	0.4	0.8

*Less than 0.1 percent.
**The percentages of postdoctorals may be underestimates, since the sources of information about foreign Ph.D.'s who came to the U.S. for postdoctoral study are incomplete.
†Percentages are not unemployment rates, since the percentages presented here are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, all of whom may not be part of the labor force. For unemployment rates, see Table 1.11.

As expected, the most apparent difference in employment status statistics for recent (1971-1976) doctorate recipients as compared with the total (1934-1976) doctoral population occurred in the area of postdoctoral appointments (8.5 ± 0.2 and 3.3 ± 0.1 percent, respectively). The highest percentages of postdoctoral appointments were in the biological sciences: 21.0 ± 0.7 percent for recent graduates and 7.8 ± 0.3 percent for the total population of 1934-1976 graduates.

The fields having the highest percentages of retired science and engineering doctorates (Table 1.4A) were the biological sciences (4.6 ± 0.2 percent) and chemistry (4.4 ± 0.3 percent).

The percentage of Ph.D.'s who were not employed and not seeking employment was similar for the total population and for recent graduates (1.0 ± <0.1 percent for total population and 1.2 ± 0.1 percent for 1971-1976 graduates). The highest percentages of Ph.D.'s who were not employed and not seeking work occurred in the field of biological sciences (1.8 ± 0.1 percent).[13]

TYPE OF EMPLOYER BY FIELD OF EMPLOYMENT

There were an estimated 267,200 Ph.D.'s in science and engineering who were employed in the U.S. in 1977. This figure includes those holding full-time or part-time positions, but excludes postdoctoral appointees. Table 1.5A shows the types of organizations reported by individuals as their principal employment in 1977.

TABLE 1.5A Type of Employer by Field of Employment for Full-Time and Part-Time Employed Doctoral Scientists and Engineers Excluding Postdoctoral Appointees, 1977

		Field of Employment												
1977 Employer	All Fields	Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Employed Population*	267,206	13,052	5,471	16,918	31,738	12,154	41,917	13,362	13,798	35,251	28,046	32,574	17,099	5,826
Educational Institution	56.2	85.3	36.2	61.5	38.3	47.4	34.5	58.4	52.5	73.3	53.4	80.9	56.5	37.0
4-Year College/Univ	53.9	82.5	36.1	59.6	35.8	46.4	34.2	57.3	52.2	71.5	48.7	79.0	48.8	35.1
2-Year College	1.6	2.4	0.1	1.8	2.2	0.8	0.3	1.0	0.4	2.0	1.6	1.8	4.5	1.4
Elem/Secnd School	0.6	0.4	0.0	*	0.3	0.2	0.0	0.0	0.0	0.2	3.1	0.1	3.2	0.6
U.S. Government	8.4	4.7	5.7	11.1	5.4	20.1	9.4	18.6	8.8	9.3	4.4	6.7	5.3	6.0
State/Local Gov't	1.9	0.1	1.5	0.1	0.6	4.1	0.9	2.3	4.3	1.3	4.0	2.7	2.8	1.1
Hospital/Clinic	2.9	0.0	0.2	0.5	1.2	0.0	0.1	0.1	8.6	2.7	17.7	0.2	0.4	2.5
Other Nonprofit Org'n	2.9	1.7	2.5	4.3	2.4	3.2	3.3	0.8	2.9	2.1	3.2	2.8	5.1	4.0
Business/Industry	26.4	8.1	53.9	22.2	51.9	24.4	51.8	19.2	21.9	9.3	16.8	4.9	28.4	27.4
Other	0.8	0.2	0.0	0.4	0.2	0.8	0.1	0.7	0.9	1.5	0.4	1.8	1.3	1.5
No Report	0.5	0.0	0.0	0.1	*	0.0	*	0.0	0.0	*	*	0.0	0.1	20.4

*Less than 0.1 percent.

†Excluded from this table are 28,621 individuals who are postdoctoral appointees, are not employed, or did not report employment status.

More than one-half (53.9 ± 0.3 percent) of the doctoral scientists and engineers were employed by four-year colleges and universities in 1977, and just over one-fourth (26.4 ± 0.2 percent) were working in business or industry. The federal government was the third-largest employer of science and engineering Ph.D.'s, with 8.4 ± 0.2 percent of the 267,200 total.

[13] Note that these percentages are not unemployment rates since they refer to individuals who are not employed and not seeking employment. This group is outside of the labor force. For unemployment rates see Table 1.11.

In two fields, mathematics and social sciences, only 14.7 ± 0.9 and 19.1 ± 0.7 percent, respectively, of the Ph.D.'s were employed outside educational institutions. For doctorate-level computer scientists, chemists, and engineers, more than 50 percent were working in the business and industry sector, and the patterns of their other employer categories were highly similar. The percentage of Ph.D.'s who held jobs in the federal government was highest for earth scientists and agricultural scientists, with about 20 percent of the Ph.D.'s in these fields reporting the U.S. government as their principal employer.

Table 1.5B also contains data on the types of employers by field, but it includes only those individuals who earned doctorates in the period 1971-1976.

TABLE 1.5B Type of Employer by Field of Employment for Full-Time and Part-Time Employed Doctoral Scientists and Engineers, 1971-1976 Graduates, Excluding Postdoctoral Appointees, 1977

1977 Employer	All Fields	Field of Employment: Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Employed Population†	90,854	4,644	2,563	4,640	7,379	4,149	14,228	4,158	4,761	11,010	12,064	14,536	5,182	1,440
Educational Institution	54.3	83.1	34.6	55.9	36.6	45.6	25.8	52.3	54.3	70.9	50.0	79.2	58.0	39.6
4-Year College/Univ	50.6	77.8	34.3	51.5	31.9	44.5	25.5	50.6	53.7	66.5	43.8	76.4	44.5	34.7
2-Year College	2.7	4.6	0.3	4.4	4.2	0.6	0.3	1.7	0.6	4.0	2.3	2.6	7.5	3.5
Elem/Secnd School	1.1	0.8	0.0	0.1	0.5	0.5	0.0	0.0	0.0	0.4	4.0	0.2	5.9	1.4
U.S. Government	8.9	6.1	5.1	13.0	6.5	18.2	13.2	18.7	9.7	8.8	4.1	3.9	5.9	7.1
State/Local Gov't	2.6	0.1	1.3	*	0.4	5.8	1.3	3.5	3.9	2.0	4.5	3.6	4.9	0.3
Hospital/Clinic	4.2	0.0	0.0	1.1	1.5	0.0	0.1	0.0	10.5	3.3	22.1	0.4	0.5	4.0
Other Nonprofit Org'n	3.2	1.3	3.1	4.8	2.3	2.7	3.3	1.3	3.5	2.6	3.5	3.7	5.5	3.4
Business/Industry	25.6	8.8	55.9	24.6	52.5	27.8	56.0	23.7	17.0	10.9	15.4	5.5	24.7	26.7
Other	0.7	0.6	0.0	0.5	0.2	*	0.2	0.5	1.1	1.6	0.4	1.7	0.5	1.2
No Report	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	17.7

*Less than 0.1 percent.
†Excluded from this table are 12,507 individuals who are postdoctoral appointees, are not employed, or did not report employment status.

Across all fields, the percentages of Ph.D.'s holding jobs at four-year colleges and universities were lower for the recent graduates (Table 1.5B) than for the 1934-1976 Ph.D.'s (Table 1.5A). This difference was largest for engineering in that 34.2 ± 1.3 percent of all doctorate-level engineers were employed by four-year colleges and universities, whereas for the 1971-1976 graduates only 25.5 ± 1.3 percent were so employed. The recent engineering doctorates were more frequently employed by the U.S. government (13.2 ± 1.0 percent) and business/industry (56.0 ± 1.5 percent) than were the total group of

doctoral engineers--9.4 ± 0.5 percent in U.S. government and 51.8 ± 0.8 percent in business/industry.

In physics, as in engineering, the percentage who were working at four-year colleges or universities was considerably lower for recent graduates than for the total Ph.D. group (51.5 ± 2.4 percent as compared with 59.6 ± 1.1 percent). Correspondingly, the recent graduates reported a higher incidence of employment at two-year colleges (4.4 ± 1.0 percent) than did the 1934-1976 doctoral physicists (1.8 ± 0.3 percent). In mathematics, chemistry, and biological sciences, it was also noted that 4 percent or more of those individuals who had earned doctorates in 1971-1976 were employed by two-year colleges.

PRIMARY WORK ACTIVITY BY FIELD OF EMPLOYMENT

In February 1977, approximately one-third of the employed science and engineering Ph.D.'s were engaged primarily in teaching. Slightly more than one-fourth (26.6 ± 0.2 percent) of the total employed were working primarily in the performance of research. Another 22.1 ± 0.2 percent held managerial or administrative jobs (Table 1.6A).

TABLE 1.6A Primary Work Activity by Field of Employment for Full-Time and Part-Time Employed Doctoral Scientists and Engineers Excluding Postdoctoral Appointees, 1977

1977 Primary Work Activity	All Fields	Field of Employment												
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Employed Population[+]	267,206	13,052	5,471	16,918	31,738	12,154	41,917	13,362	13,798	35,251	28,046	32,574	17,099	5,826
Teaching	32.5	64.4	21.0	32.5	25.0	27.9	19.9	20.1	18.8	37.1	32.8	58.9	27.1	14.9
Research	26.6	21.1	13.4	43.7	38.2	35.6	23.4	37.9	28.7	41.8	11.4	16.7	4.4	12.4
Administration of:	22.1	7.7	24.3	16.3	24.5	23.9	31.5	23.1	29.6	13.6	16.0	14.3	46.0	19.5
–Research/Development	14.1	3.4	16.2	13.4	20.2	15.8	23.3	17.4	19.5	9.8	6.8	7.2	14.2	12.9
–Other	8.0	4.3	8.1	2.9	4.3	8.1	8.2	5.7	10.2	3.8	9.2	7.1	31.8	6.6
Consulting/Prof. Services	6.6	1.2	3.4	1.2	1.3	3.0	3.9	5.3	13.7	1.7	34.1	2.3	5.1	4.5
Design/Development	4.8	2.8	32.0	3.7	5.2	1.6	15.9	2.1	1.8	0.9	0.5	0.7	1.9	3.4
Writing/Editing	1.8	1.3	0.8	0.8	1.1	2.3	0.9	3.4	1.4	2.0	1.9	3.1	2.9	1.9
Marketing/Production/Inspection	1.5	0.2	1.5	0.6	2.7	1.6	2.1	2.7	1.1	0.5	0.5	0.1	4.7	3.7
Other	1.9	0.8	1.2	0.7	1.2	2.5	1.5	4.0	2.8	1.2	1.5	1.9	5.8	3.4
No Report	2.1	0.6	2.3	0.5	0.9	1.5	0.9	1.5	2.1	1.1	1.3	1.9	2.1	36.2

[+]Excluded from this table are 28,621 individuals who are postdoctoral appointees, are not employed, or did not report employment status.

In mathematics, the proportion of Ph.D.'s who were teaching was nearly two-thirds (64.4 ± 1.2 percent), whereas in computer science, engineering, medical science, and agricultural science, only one-fifth of the Ph.D.'s cited teaching as their primary work activity.

Research was reported more frequently than any other activity for five employment fields: physics, biological sciences, chemistry, earth sciences, and agricultural sciences.

In psychology, which employed an estimated 28,000 Ph.D.'s, 34.1 ± 0.8 percent were involved in consulting or providing professional services, roughly the same percentage as those in teaching (32.8 ± 0.9 percent).

Table 1.6B shows the percentage distribution of work activities confined to those scientists and engineers who earned doctorates in the period 1971-1976. In general, the recent science and engineering Ph.D.'s were less frequently engaged in administration as a primary activity and were more often working in research than the total 1934-1976 Ph.D. group. Overall, 2[illegible] ± 0.2 percent of the doctoral scientists and engineers were administrators (Table 1.6A), whereas only 13.9 ± 0.4 percent of the 1971-1976 graduates held administrative positions (Table 1.6B).

TABLE 1.6B Primary Work Activity by Field of Employment for Full-Time and Part-Time Employed Doctoral Scientists and Engineers, 1971-1976 Graduates, Excluding Postdoctoral Appointees, 1977

1977 Primary Work Activity	Field of Employment													
	All Fields	Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Employed Population[+]	90,854	4,644	2,563	4,640	7,379	4,149	14,228	4,158	4,761	11,010	12,064	14,636	5,182	1,440
Teaching	34.4	67.8	22.0	26.4	22.6	29.7	14.5	23.7	20.1	37.8	31.9	63.0	36.7	18.5
Research	29.3	20.4	15.6	55.4	51.8	42.5	32.4	34.7	34.3	44.4	10.9	18.4	6.5	14.7
Administration of:	13.9	3.7	16.1	10.4	12.6	13.9	20.6	18.4	19.4	9.4	11.5	9.4	28.9	10.8
–Research/Development	8.5	2.1	11.8	8.7	9.5	9.3	14.8	15.1	11.5	6.2	4.5	5.3	8.8	4.2
–Other	5.4	1.6	4.3	1.7	3.0	4.5	5.9	3.3	7.9	3.2	6.9	4.1	20.1	6.6
Consulting/Prof. Services	8.7	1.7	3.3	1.3	0.6	3.7	4.2	7.3	14.5	2.2	40.9	2.2	6.2	5.0
Design/Development	6.4	3.9	36.0	4.0	6.0	2.1	22.2	3.2	3.1	1.4	0.6	0.7	3.1	6.1
Writing/Editing	1.6	0.8	0.1	1.4	0.7	1.7	0.8	3.7	1.8	1.3	0.9	2.8	2.9	1.9
Marketing/Production/ Inspection	1.8	0.4	1.1	0.9	3.6	3.1	2.7	3.7	1.0	0.7	0.8	*	6.9	4.5
Other	1.9	0.5	1.6	0.3	1.1	2.0	1.2	4.7	2.5	1.9	1.4	2.0	5.8	1.9
No report	1.9	0.8	4.3	0.0	1.0	1.4	1.4	0.8	3.1	0.7	1.2	1.3	2.9	36.4

*Less than 0.1 percent.

[+]Excluded from this table are 12,507 individuals who are postdoctoral appointees, are not employed, or did not report employment status.

In chemistry and physics, the percentages who were working primarily in research were considerably higher for the recent graduates than for the total Ph.D. group. For example, 51.8 ± 1.8 percent of those chemists who earned doctorates in the period 1971-1976 held research positions, as compared with 38.2 ± 0.8 percent of the total 1934-1976 doctorate recipients.

For engineers, the proportion who were teaching was lower for the recent graduates (14.5 ± 1.0 percent) than for the total (19.9 ± 0.6 percent). Design and development, on the other hand, were cited by 22.2 ± 1.2 percent of the recent Ph.D.'s employed in engineering as compared with 15.9 ± 0.6 percent of the total doctoral engineers.

ACADEMIC RANK BY COHORT, FIELD OF DOCTORATE, AND SEX

Table 1.7 shows the percentage distribution of Ph.D. scientists and engineers who were employed by U.S. colleges and universities in 1977 by sex, field of Ph.D., year of Ph.D., and academic rank.

In general, the proportion of science and engineering Ph.D.'s at the professor and associate professor levels was far greater for men than for women. The differences in academic rank for men and women were greatest for the 1950-1959 Ph.D.'s. In this cohort, 81.9 ± 0.7 percent of the men were full professors in 1977 (that is, 18 to 27 years after earning the doctorate), compared with 53.5 ± 2.4 percent of the women. For the 1960-1969 Ph.D.'s, 42.8 ± 0.6 percent of the men and only 21.6 ± 0.9 percent of the women were full professors. However, for the most recent graduates, i.e., those who earned science and engineering doctorates in 1975-1976, the proportion of the women who were professors or associate professors in 1977 was roughly equivalent to the percentage of the men who were in these ranks.

For the 1934-1949 cohort in most fields, the numbers of women are generally too small to permit comparisons. In the biological sciences, however, where the number of 1934-1949 women Ph.D.'s is greatest, the percentage of women who were professors in 1977 was only 42.1 ± 6.4 percent, compared with 82.4 ± 1.8 percent of the men.

For more recent graduates, i.e., 1960-1969 doctorate recipients, the differences in academic ranks for men versus women were pronounced in chemistry

TABLE 1.7 Rank For Academically Employed Doctoral Scientists and Engineers by Cohort, Field of Doctorate, and Sex, 1977

Ph.D. Cohort and Rank	All Fields		Field of Doctorate and Sex																			
			Mathematics		Comptr Sci		Phys/Astrn		Chemistry		Earth Sci		Engineering		Agric Sci		Medical Sci		Bio Sci		Psychology		Social Sci	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Total, 1934-1949 Ph.D.'s	3,566	731	656	60	–	–	823	28	1,682	73	225	7	532	1	452	–	155	19	2,113	285	533	106	1,395	152
Professor	82.6	56.5	92.1	66.7			65.9	60.7	79.4	53.4	83.6	100.0	83.8	100.0	85.2		89.0	0.0	82.4	42.1	93.1	72.6	85.7	73.7
Associate Professor	6.1	16.1	6.3	23.3			6.4	0.0	9.5	12.3	6.2	0.0	6.8	0.0	1.1		3.9	31.6	6.5	23.2	1.3	16.0	4.7	3.9
Assistant Professor	0.9	6.0	0.0	6.7			0.0	0.0	0.7	8.2	0.0	0.0	0.0	0.0	1.3		0.0	0.0	1.4	10.9	0.0	2.8	2.2	0.0
Instructor, Lecturer, Other	3.9	14.8	0.6	1.7			7.5	25.0	5.7	17.8	0.0	0.0	3.8	0.0	6.4		0.0	68.4	2.9	17.5	3.0	5.7	3.6	11.8
No Rank Reported	6.5	6.6	1.1	1.7			20.2	14.3	4.7	8.2	10.2	0.0	5.6	0.0	6.0		7.1	0.0	6.8	6.3	2.6	2.8	3.7	10.5
Total, 1950-1959 Ph.D.'s	25,704	1,828	1,615	63	17	–	2,761	59	2,925	240	850	21	2,517	4	1,595	16	570	56	5,604	643	2,649	348	4,601	378
Professor	81.9	53.5	86.7	69.8	100.0		73.5	61.0	73.5	52.9	87.3	52.4	87.4	25.0	81.6	87.5	77.9	73.2	78.7	45.4	83.5	54.6	90.2	58.7
Associate Professor	9.9	23.2	9.6	12.7	0.0		8.4	15.3	11.0	21.3	6.7	14.3	6.0	0.0	12.7	6.3	11.4	25.0	14.6	24.0	10.8	23.9	5.9	26.7
Assistant Professor	0.9	5.4	0.5	6.3	0.0		0.0	6.8	0.7	2.1	0.0	4.8	0.4	0.0	2.5	0.0	1.8	0.0	1.3	5.9	2.4	5.7	0.2	6.9
Instructor, Lecturer, Other	1.7	9.2	0.2	1.6	0.0		2.6	11.9	2.1	12.5	2.2	0.0	1.9	75.0	0.7	0.0	3.9	0.0	2.0	15.2	0.4	4.9	1.4	3.2
No Rank Reported	5.6	8.8	2.9	9.5	0.0		15.5	5.1	12.7	11.3	3.8	28.6	4.3	0.0	2.5	5.3	5.1	1.8	3.5	9.5	2.9	10.9	2.3	4.5
Total, 1960-1969 Ph.D.'s	53,159	5,167	4,617	322	161	11	5,472	111	5,311	526	1,725	31	7,870	31	2,849	41	1,370	138	9,905	1,740	4,562	1,128	9,317	1,088
Professor	42.8	21.6	42.1	29.5	49.7	36.4	34.6	7.2	35.5	13.7	50.3	12.9	48.4	35.5	49.0	41.5	42.6	29.7	35.8	15.9	39.7	20.4	53.1	33.0
Associate Professor	41.9	38.7	45.5	46.9	41.0	36.4	36.8	39.6	43.6	32.5	42.2	51.6	37.0	22.6	40.3	39.0	44.2	39.1	45.6	34.9	46.3	37.7	40.3	46.2
Assistant Professor	6.9	20.4	8.1	13.7	0.0	27.3	7.9	20.7	8.7	20.0	1.5	16.1	4.1	25.8	5.2	4.9	8.4	15.2	11.9	27.8	5.9	21.8	4.0	10.3
Instructor, Lecturer, Other	3.3	12.8	2.6	7.8	0.0	9.0	6.1	18.0	5.9	24.0	3.1	19.4	2.2	9.7	3.3	14.6	2.9	11.6	3.1	14.8	4.2	12.8	1.5	5.1
No Rank Reported	5.0	6.6	1.7	2.?	9.3	0.0	14.6	14.4	6.3	9.9	2.9	0.0	8.4	6.5	2.2	0.0	2.0	4.3	3.7	6.7	3.9	7.4	1.1	5.3
Total, 1970-1974 Ph.D.'s	40,062	6,921	3,278	316	419	27	3,419	135	3,126	410	1,366	68	3,798	42	1,979	82	1,286	260	7,910	2,127	3,894	1,474	9,587	1,980
Professor	4.4	2.0	5.6	1.9	1.2	0.0	1.8	0.0	2.5	1.7	1.4	5.9	6.0	0.0	5.4	0.0	4.1	8.5	2.9	1.1	1.6	1.1	7.6	3.1
Associate Professor	29.5	17.8	35.8	16.5	38.4	11.1	17.9	6.7	14.6	8.5	31.4	4.4	31.5	19.0	34.4	22.0	28.1	28.5	20.0	8.6	29.4	18.1	42.1	29.2
Assistant Professor	46.9	53.1	50.1	61.1	51.6	81.5	38.3	38.5	47.9	37.1	39.4	69.1	41.6	52.4	44.9	28.0	47.1	40.4	51.5	48.7	55.4	59.0	44.5	58.2
Instructor, Lecturer, Other	10.8	18.2	3.9	16.5	6.2	0.0	16.5	31.9	22.4	33.7	13.8	19.1	7.6	7.1	10.1	32.9	17.9	16.9	16.6	28.7	9.8	13.3	3.3	6.8
No Rank Reported	8.4	8.9	4.6	4.1	2.6	7.4	25.5	23.0	12.6	19.0	14.0	1.5	13.3	21.4	5.3	17.1	2.7	5.8	9.0	12.9	3.8	8.5	2.4	2.6
Total, 1975-1976 Ph.D.'s	11,456	2,704	900	109	132	25	918	43	907	139	443	57	1,255	16	478	36	357	146	2,328	698	1,214	590	2,524	845
Professor	0.5	1.0	1.3	1.8	0.0	0.0	0.0	2.3	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.0	6.8	0.0	0.0	1.5	0.8	0.8	1.2
Associate Professor	4.6	5.0	2.4	5.5	35.6	0.0	2.1	4.7	0.1	7.2	4.5	0.0	5.5	0.0	13.6	0.0	4.5	26.0	1.5	2.7	2.5	0.5	8.0	6.6
Assistant Professor	50.2	51.8	64.0	65.1	53.8	92.0	22.2	11.6	23.4	20.1	58.9	38.6	49.0	43.8	63.2	44.4	32.8	18.5	32.0	30.1	59.0	66.6	76.3	71.0
Instructor, Lecturer, Other	24.9	25.2	29.4	25.7	0.0	8.0	36.7	58.1	39.9	36.0	23.3	28.1	16.0	6.3	20.9	16.7	35.0	33.6	36.3	33.0	20.8	23.1	10.5	16.4
No Rank Reported	19.8	16.9	2.8	1.8	10.6	0.0	39.0	23.3	36.6	36.7	13.3	33.3	28.9	50.0	2.3	38.9	27.7	15.1	30.3	34.2	16.3	9.0	4.3	4.7

and the biological sciences. In these fields the percentage of men who were professors in 1977 was more than double that for women.

Women who earned doctorates in 1975-1976 in medical sciences reported a greater proportion in the professor and associate professor ranks than did men (33.8 ± 7.4 percent for women; 4.5 ± 2.2 percent for men). In other fields, however, differences between the proportion of men and women in the professor and associate professor ranks are not statistically significant for the 1975-1976 doctorates.

MEDIAN ANNUAL SALARY BY SEX, AGE, AND FIELD OF EMPLOYMENT

The median annual salary in 1977 for full-time-employed doctoral scientists and engineers, excluding those in the U.S. military, was $25,600 ± $100 (Table 1.8). Ph.D.'s employed in engineering ($28,500 ± $200) and medical sciences ($28,000 ± $300) reported the highest median salaries. Mathematicians had one of the lowest median salaries ($23,200 ± $200), along with biological scientists, social scientists, and psychologists, who also reported salaries less than $24,000 per year.

Men received median annual salaries of $26,000 ± $100, while women earned $20,700 ± $100. Figure 1.1 shows that women reported lower median salaries than men in all fields. Among men working in a science or engineering field, those employed in medical sciences and engineering reported the highest salaries ($28,900 ± $300 and $28,600 ± $200, respectively). For women, those working in physics/astronomy ($23,100 ± $600), engineering ($22,900 ± $400), and medical sciences ($22,800 ± $400) had the highest estimated medians. Large salary differences between men and women occurred in the fields of medical sciences, where men earned $28,900 ± $300 and women earned $22,800 ± $400, and earth sciences, where men earned $26,000 ± $300 compared with $19,700 ± $500 for women.

Ph.D.'s under 30 years of age had median salaries of $18,500 ± $100, with men and women earning $18,700 ± $100 and $17,400 ± $200, respectively. Salary differences between men and women Ph.D.'s tended to increase in older age cohorts. In the 55-59 age group, for example, the estimated median salaries were $32,400 ± $300 for men and $24,100 ± $300 for women.

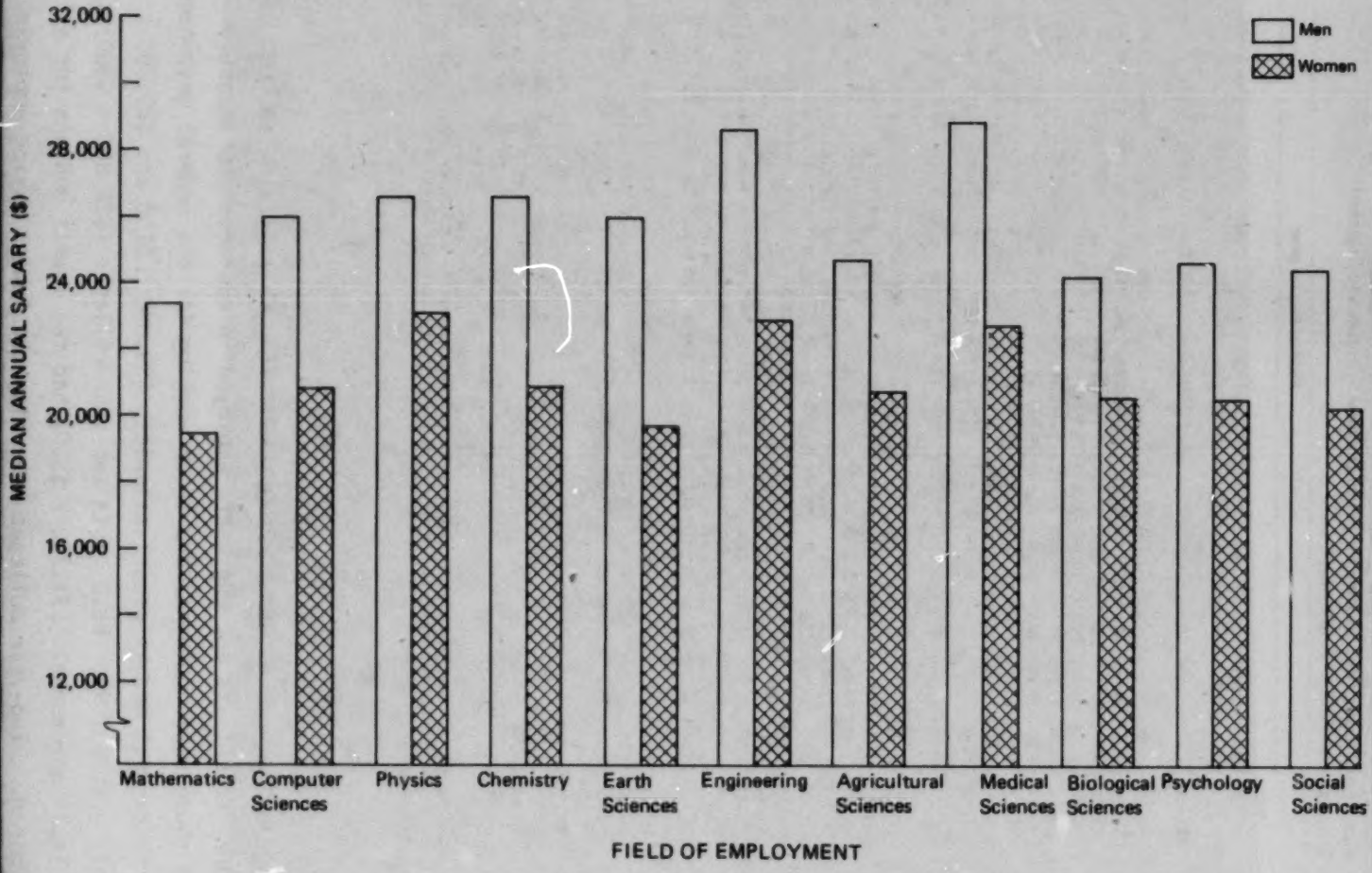


FIGURE 1.1 Median Annual Salaries of Full-Time Employed Doctoral Scientists and Engineers by Field of Employment and Sex, 1977*

*For relationships between cohorts and salaries refer to Table 1.8.

TABLE 1.8 Median Annual Salaries of Full-Time Employed Doctoral Scientists and Engineers by Sex, Age, and Field of Employment, 1977

Sex and Age in 1977	All Fields	Field of Employment												
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Male and Female, Total+	$25,600	23,200	25,800	26,400	26,400	25,800	28,500	24,800	28,000	23,600	23,800	23,800	26,900	28,600
Under 30	18,500	16,900	19,600	21,400	20,000	20,200	21,300		18,400	17,600	17,300	18,600	15,400	
30-34	20,400	18,800	21,600	20,800	21,300	20,400	24,000	20,000	20,600	19,000	19,400	19,200	20,800	21,200
35-39	23,700	22,400	25,600	23,800	24,400	23,800	27,200	22,100	25,000	21,700	22,200	22,000	23,700	25,500
40-44	26,600	24,900	28,800	27,800	28,100	25,800	29,400	24,700	30,400	24,400	25,300	24,300	26,700	26,900
45-49	29,400	28,600	33,200	30,500	30,300	29,400	31,300	26,300	30,800	26,800	27,900	26,200	29,400	31,100
50-54	31,000	31,600	33,900	33,100	32,200	32,400	34,000	28,400	32,800	29,500	29,900	29,700	29,900	33,700
55-59	31,800	30,600	35,300	33,900	32,000	33,400	34,600	29,800	33,800	29,600	30,600	30,400	33,400	39,300
60-64	31,600	31,400		32,900	34,000	34,400	33,800	28,600	35,900	29,900	30,200	30,800	32,700	36,500
Over 64	31,500	36,300		36,500	29,800	32,800	33,100	27,100	33,700	30,000	30,300	34,400	35,600	
Male, Total+	$26,000	23,500	26,000	26,500	26,700	26,000	28,600	24,800	28,900	24,200	24,700	24,400	28,200	30,000
Under 30	18,700	16,900		21,500	20,100		21,400		18,400	17,900	17,300	18,700		
30-34	20,700	18,900	21,700	20,900	21,400	20,500	24,100	20,100	20,700	19,300	19,900	19,500	21,700	21,400
35-39	24,000	22,500	25,800	23,800	24,600	24,000	27,200	22,100	25,500	22,000	22,400	22,300	24,200	25,700
40-44	26,900	25,100	28,900	27,800	28,300	25,900	29,400	24,700	31,100	24,900	26,000	24,600	27,100	28,800
45-49	29,900	29,000	33,400	30,600	30,500	29,500	31,400	26,400	31,500	27,500	29,400	26,800	30,300	31,300
50-54	31,500	31,900	35,100	33,100	32,600	32,500	34,000	28,500	34,300	30,100	30,500	30,400	30,700	34,300
55-59	32,400	30,700		33,900	32,700	33,400	34,600	29,800	35,100	30,100	31,200	30,600	34,300	39,900
60-64	32,200	31,700		33,100	34,300	34,400	33,800	28,700	39,100	30,400	30,800	31,100	34,500	39,600
Over 64	32,400	36,500			29,900	32,800	33,100	27,100	39,300	30,200	31,300	35,400	36,000	
Female, Total+	$20,700	19,600	20,800	23,100	20,900	19,700	22,900	20,800	22,800	20,500	20,500	20,200	20,400	21,400
Under 30	17,400	17,000			18,000						17,600	17,300		
30-34	18,400	18,000	20,500	19,500	19,300	18,400	21,500		19,300	18,000	18,400	18,000	18,200	
35-39	20,100	19,900	19,500	21,000	20,100	19,600	26,300		21,100	19,900	20,400	20,000	18,900	
40-44	21,800	20,400		26,000	22,200				23,900	20,800	22,400	21,100	23,100	
45-49	23,100	20,400		27,000	21,300				25,800	23,200	23,800	21,400	22,800	
50-54	24,700	24,500			24,700				25,300	24,800	25,000	24,100	24,100	
55-59	24,100	27,700			21,900				25,200	24,500	25,200	23,300	20,600	
60-64	25,000								24,500	24,900	25,200	25,200	22,800	
Over 64	25,500										26,300			

NOTE: Median salaries were computed only for Ph.D.'s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians have not been calculated for cells with less than 20 cases reporting salary.
+Includes those not reporting age.

MEDIAN ANNUAL SALARY BY SEX, TYPE OF EMPLOYER, AND FIELD OF EMPLOYMENT

Doctoral scientists and engineers employed in business and industry (including those self-employed) and those working for the federal government reported the highest median annual salaries, $29,900 ± $200 and $29,700 ± $200, respectively (Table 1.9). Ph.D.'s in two-year colleges ($20,800 ± $300) and state and local government ($21,700 ± $300) had the lowest medians for all fields combined. Two-year colleges were also the lowest paying employer for

those working in mathematics ($17,000 ± $600), physics ($20,200 ± $700), and psychology ($19,000 ± $500). State and local governments were the lowest paying employers of earth scientists ($20,500 ± $400) and agricultural scientists ($20,400 ± $600). For mathematicians and engineers, those employed by nonprofit organizations received salaries equivalent to those paid by business and industry or the federal government for all fields combined.

TABLE 1.9 Median Annual Salaries of Full-Time Employed Doctoral Scientists and Engineers by Sex, Type of Employer, and Field of Employment, 1977

Sex and Type of Employer	All Fields	Field of Employment												
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc	Nonsc	No Report
Male and Female, Total	25,600	23,200	25,800	26,400	26,400	25,800	28,500	24,800	28,000	23,600	23,800	23,800	26,900	28,600
Educational Institution	23,600	22,500	24,300	24,400	22,800	23,500	26,400	23,600	25,800	22,700	22,300	22,800	25,500	24,200
4-Year College/Univ	23,800	22,700	24,300	24,600	22,900	23,600	26,400	23,700	25,800	22,800	22,300	22,800	25,900	24,300
2-Year College	20,800	17,700		20,200	20,600					20,000	19,000	22,300	23,400	
Elem/Sec School	22,200										22,900		20,000	
Federal Government	29,700	29,300	30,500	29,700	28,900	30,700	29,400	27,600	32,300	27,800	30,300	32,900	36,800	30,700
State/Local Gov't	21,700				20,300	20,500	21,700	20,400	23,600	20,100	23,000	21,300	24,000	
Hospital/Clinic	23,500				26,800				26,900	23,800	23,000			
Other Nonprofit Org.	27,100	30,200		27,200	25,000	27,400	30,000		25,700	22,700	24,500	27,700	22,700	
Business/Industry	29,900	27,700	26,700	29,800	29,500	28,700	29,900	27,100	33,200	27,300	33,800	30,100	31,800	33,900
Other/No Report	29,100								30,800	23,200		33,000	39,400	
Male, Total	26,000	23,500	26,000	26,500	26,700	26,000	28,600	24,800	28,900	24,200	24,700	24,400	28,200	30,000
Educational Institution	24,100	22,800	24,600	24,500	23,100	23,700	26,500	23,600	26,800	23,200	22,900	23,400	26,100	24,500
4-Year College/Univ	24,200	22,900	24,600	24,600	23,300	23,800	26,500	23,700	26,700	23,300	22,900	23,400	26,700	24,600
2-Year College	21,200	17,700		20,300	20,800					19,900	18,900	23,600	23,800	
Elem/Sec School	22,700										24,600		20,500	
Federal Government	29,900	29,400	30,500	29,700	29,100	30,800	29,400	27,600	32,500	28,000	30,500	33,000	37,100	
State/Local Gov't	21,900				20,500	20,600	21,700	20,500	23,800	20,200	23,100	21,400	24,700	
Hospital/Clinic	24,100				28,300				28,800	25,500	23,500			
Other Nonprofit Org.	27,900	30,500		27,500	25,200	27,500	30,000		26,100	23,300	27,400	29,400	25,000	
Business/Industry	30,000	27,800	27,000	29,900	29,700	28,800	30,000	27,100	33,700	27,700	35,200	30,100	32,600	34,000
Other/No Report	30,400									23,800		33,500	39,500	
Female, Total	20,700	19,600	20,800	23,100	20,900	19,700	22,900	20,800	22,800	20,500	20,500	20,200	20,400	21,400
Educational Institution	19,900	19,100	19,700	21,100	19,000	18,600	21,500	20,600	22,200	20,200	19,400	19,700	20,500	20,100
4-Year College/Univ	19,900	19,400	19,700	21,500	18,900	18,600	21,400	20,600	22,300	20,200	19,000	19,700	21,000	20,600
2-Year College	19,700				20,200					20,300	19,200		18,500	
Elem/Sec School	20,700										22,100		19,200	
Federal Government	26,600			28,500	25,600	23,500			28,700	25,600		30,300		
State/Local Gov't	21,000								22,600	18,600	22,600	21,200	19,600	
Hospital/Clinic	20,900								22,100	21,100	20,900			
Other Nonprofit Org.	21,800				23,000					19,900	21,500	24,300	20,300	
Business/Industry	24,400		23,200	25,000	23,300	22,500	23,400		25,700	23,000	25,800	26,800	21,300	
Other/No Report	20,600													

NOTE: Median salaries were computed only for Ph.D.'s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians have not been calculated for cells with less than 20 cases reporting salary.

A comparison of male and female salaries shows men earning higher salaries in a number of employer categories. In business and industry, men earned $30,000 ± $200, whereas women received $24,400 ± $400. Men employed by the federal government had a median salary of $29,900 ± $200 compared with $26,600 ± $800 for women. These were the highest paying employers for both sexes. Salary differences between men and women were also observed in four-year colleges and universities and nonprofit organizations.

For both men and women Ph.D.'s, two-year colleges were among the lowest paying employers when all fields of employment are combined. However, while men employed at two-year institutions had a median salary below that for men working for four-year colleges or universities ($21,200 ± $600 compared to $24,200 ± $100), women at two-year schools earned substantially the same salary as those in the four-year institutions ($19,700 ± $400 versus $19,900 ± $100).

GEOGRAPHIC DIFFERENCES IN EMPLOYMENT STATUS

U.S. Total

The labor force of doctoral scientists and engineers in 1977 was over 280,200. Nationwide, Table 1.10 shows that 92.8 ± 0.1 percent of the labor force were working full-time, whereas 1.2 ± 0.1 were unemployed and seeking work. The remaining 6.0 ± 0.1 percent of the labor force held part-time jobs or postdoctoral appointments.

Regional Variations

Regionally, the East South Central states of Alabama, Kentucky, Mississippi, and Tennessee and the West North Central states of Iowa, Kansas, Minnesota, Missouri, North Dakota, Nebraska, and South Dakota reported the highest rates of full-time employment--95.2 ± 0.6 and 95.1 ± 0.4 percent, respectively. The Pacific states of Alaska, California, Hawaii, Oregon, and Washington and the New England states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont had the lowest percentage of the labor force working full-time--89.7 ± 0.4 and 90.1 ± 0.6 percent, respectively.

TABLE 1.10 Employment, Unemployment, and Labor Force of Doctoral Scientists and Engineers by States, 1977

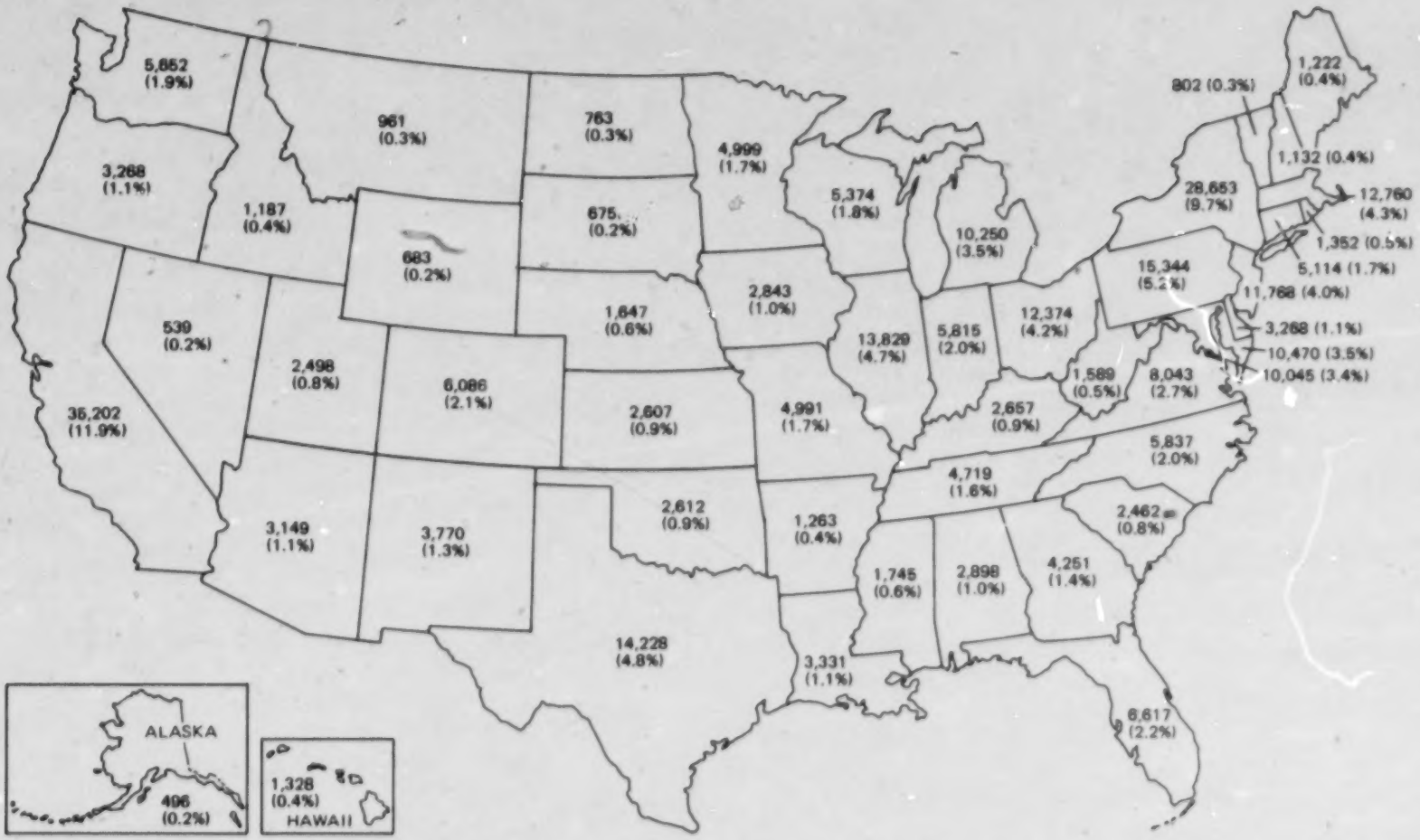
(Standard errors in parentheses)

1977 Employment Location	Total Ph.D. Labor Force*	Full-Time Employed	Unemployed Seeking Employment+	Other Labor Force#
All Locations	280,222	92.8% (0.1)	1.2% (0.1)	6.0%
New England	21,152	90.1 (0.6)	1.2 (0.2)	8.7
Connecticut	4,835	91.9 (1.0)	0.8 (0.3)	7.3
Maine	1,059	95.6 (1.9)	0.2 (0.1)	4.2
Massachusetts	12,186	88.1 (0.8)	1.4 (0.3)	10.5
New Hampshire	1,050	91.6 (2.4)	1.4 (1.1)	7.0
Rhode Island	1,293	95.9 (1.8)	1.5 (1.1)	2.6
Vermont	729	92.6 (2.1)	1.4 (1.0)	6.0
Middle Atlantic	52,977	92.7 (0.3)	1.3 (0.1)	6.1
New Jersey	11,193	95.4 (0.5)	1.2 (0.3)	3.4
New York	27,281	91.5 (0.5)	1.4 (0.2)	7.1
Pennsylvania	14,503	92.8 (0.6)	1.0 (0.2)	6.2
East North Central	45,418	93.9 (0.3)	1.0 (0.1)	5.1
Illinois	13,174	93.5 (0.6)	1.6 (0.3)	4.9
Indiana	5,554	94.9 (0.8)	0.5 (0.2)	4.6
Michigan	9,785	93.5 (0.7)	0.7 (0.3)	5.7
Ohio	11,805	95.3 (0.6)	0.7 (0.2)	4.0
Wisconsin	5,100	91.7 (1.1)	0.7 (0.4)	7.5
West North Central	17,651	95.1 (0.4)	0.8 (0.2)	4.1
Iowa	2,686	96.1 (1.0)	0.6 (0.4)	3.3
Kansas	2,465	94.3 (1.3)	0.7 (0.3)	4.9
Minnesota	4,701	94.4 (0.9)	0.7 (0.2)	4.9
Missouri	4,824	94.8 (0.8)	1.1 (0.4)	4.1
North Dakota	756	97.0 (1.6)	-	3.0
Nebraska	1,551	95.9 (1.4)	0.7 (0.6)	3.4
South Dakota	668	96.9 (1.9)	-	3.1
South Atlantic	49,246	93.6 (0.3)	1.0 (0.1)	5.5
Delaware	3,037	98.1 (0.6)	0.2 (0.2)	1.8
District of Columbia	9,788	94.1 (0.7)	0.3 (0.2)	5.6
Florida	5,783	92.5 (1.0)	2.1 (0.6)	5.4
Georgia	4,064	95.3 (1.0)	1.0 (0.4)	3.7
Maryland	9,788	89.1 (0.9)	1.6 (0.3)	9.3
North Carolina	5,519	92.4 (1.0)	0.9 (0.4)	6.6
South Carolina	2,203	96.3 (1.3)	0.1 (0.1)	3.5
Virginia	7,554	96.0 (0.7)	0.9 (0.3)	3.1
West Virginia	1,510	97.6 (0.9)	0.5 (0.5)	1.9
East South Central	11,614	95.2 (0.6)	0.3 (0.1)	4.5
Alabama	2,784	95.6 (1.1)	0.3 (0.2)	4.2
Kentucky	2,587	94.7 (1.1)	-	5.3
Mississippi	1,687	98.7 (0.5)	0.3 (0.3)	1.0
Tennessee	4,556	93.9 (1.0)	0.5 (0.3)	5.6
West South Central	20,441	94.8 (0.4)	0.9 (0.2)	4.3
Arkansas	1,196	95.3 (1.9)	0.8 (0.7)	3.9
Louisiana	3,155	95.0 (1.0)	1.0 (0.4)	4.0
Oklahoma	2,487	97.6 (0.7)	0.9 (0.5)	1.4
Texas	13,603	94.1 (0.6)	0.9 (0.2)	4.9
Mountain	17,673	92.9 (0.6)	1.3 (0.2)	5.8
Arizona	2,807	89.7 (1.6)	2.5 (0.8)	7.7
Colorado	5,762	91.5 (1.0)	1.0 (0.4)	7.4
Idaho	1,137	95.5 (1.7)	1.6 (1.0)	2.9
Montana	894	93.7 (2.6)	-	6.3
New Mexico	3,536	95.5 (1.1)	0.7 (0.4)	3.8
Nevada	509	99.0 (0.6)	-	1.0
Utah	2,387	93.0 (1.6)	0.5 (0.4)	6.6
Wyoming	641	94.2 (3.5)	5.8 (3.5)	
Pacific	43,473	89.7 (0.4)	2.0 (0.2)	8.3
Alaska	494	99.4 (0.4)	-	0.6
California	33,220	89.6 (0.5)	1.7 (0.2)	8.6
Hawaii	1,287	89.8 (2.4)	2.8 (1.1)	7.4
Oregon	3,075	86.6 (1.8)	5.1 (1.1)	8.3
Washington	5,397	90.9 (1.1)	2.2 (0.6)	6.9
U.S. Possessions	577	97.2 (1.6)	-	2.8

*Labor force includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

+Dash (-) indicates none in sample reporting unemployed/seeking employment status.

#Includes part-time employed plus postdoctoral appointees.



Note: Sampling errors associated with the percentage estimates for each state may be approximated by using the procedure discussed in Appendix D.

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FIGURE 1.2 Geographic Distribution of Doctoral Scientists and Engineers, 1977* (Estimated Population of 1934-76 Doctoral Scientists and Engineers in the U.S. = 295,168, excluding 659 in U.S. possessions).

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State Variation

Because of the small number of Ph.D.'s in many of the states, all employment statistics, and particularly the unemployment rates, should be interpreted in conjunction with the sampling errors. Sampling errors for employment data are presented in Table 1.10. The reader may construct confidence intervals at the level deemed appropriate.

In the states of North Dakota, South Dakota, Kentucky, Montana, Nevada, Alaska, and the U.S. possessions, no sample individuals reported being unemployed and seeking employment.

The estimated number of doctoral scientists and engineers residing in each state is shown in Figure 1.2.

EMPLOYMENT STATUS BY SEX AND FIELD OF DOCTORATE

While 1.2 ± 0.1 percent of the total labor force of doctoral scientists and engineers in the U.S. were unemployed and seeking work in 1977, conditions varied by sex. The unemployment rates were 0.9 ± 0.1 percent for men compared with 3.6 ± 0.3 percent for women.

Data in Table 1.11 include the unemployment rates for men and women Ph.D.'s. In physics/astronomy, 5.7 ± 0.1 percent of the women were unemployed, whereas 1.0 ± 0.2 percent of the male physicists/astronomers were unemployed. In chemistry, the unemployment rates were 5.0 ± 0.6 percent for women and 0.9 ± 0.1 percent for men. The sampling errors in certain fields, especially for women, are large in relation to the unemployment statistics.

Of the approximately 252,900 male doctoral scientists and engineers in the labor force, 94.5 ± 0.1 percent held full-time jobs. For women, however, only 77.3 ± 0.5 percent of a labor force of about 27,300 were employed full-time, while 19.1 ± 0.5 percent worked part-time or held postdoctoral appointments.

In all fields except computer science, relatively low proportions of women in the labor force held full-time positions. Less than 75 percent of the women in physics and biological sciences, for example, were engaged in full-time employment in 1977.

TABLE 1.11 Employment Status, Including Unemployment Rates, of Doctoral Scientists and Engineers by Sex and Field of Doctorate, 1977

Sex and 1977 Employment Status	Total	Field of Doctorate										
		Math	Comp Sci	Phys/ Astrn	Chem	Earth Sci	Engr	Agric Sci	Med Sci	Bio Sci	Psych	Soc Sci
Total, Males and Females												
Number in Labor Force+	280,222	15,168	1,503	25,355	41,667	9,198	43,072	12,924	7,647	49,533	32,636	41,519
Employed Full-Time	92.8	96.0	99.9	92.2	93.1	93.8	97.4	96.5	90.6	87.2	90.5	94.3
Unemployed, Seeking Employment	1.2	1.2	0.0	1.1	1.2	1.0	0.6	0.5	1.1	1.7	1.3	1.5
Other Labor Force	6.0	2.8	0.1	6.7	5.7	5.2	2.0	3.0	8.4	11.1	8.2	4.2
Males												
Number in Labor Force+	252,940	14,119	1,401	24,709	39,116	8,866	42,841	12,663	6,629	41,791	25,093	35,712
Employed Full-Time	94.5	96.8	100.0	92.7	94.3	94.5	97.4	97.0	92.2	90.0	94.6	95.9
Unemployed, Seeking Employment	0.9	1.0	0.0	1.0	0.9	0.9	0.6	0.5	1.0	1.3	0.9	1.0
Other Labor Force	4.6	2.2	0.0	6.3	4.7	4.6	2.0	2.5	6.8	8.8	4.5	3.0
Females												
Number in Labor Force+	27,282	1,049	102	646	2,551	332	231	261	1,018	7,742	7,543	5,807
Employed Full-Time	77.3	85.7	98.0	71.7	74.5	75.0	85.3	72.8	79.6	72.3	76.6	84.6
Unemployed, Seeking Employment	3.6	3.2	0.0	5.7	5.0	4.8	3.0	2.7	1.6	3.9	2.6	4.0
Other Labor Force	19.1	11.1	2.0	22.6	20.5	20.2	11.7	24.5	18.9	23.8	20.8	11.5

+Labor force includes full-time employed, part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

LONGITUDINAL ANALYSIS OF EMPLOYMENT STATUS BY FIELD OF DOCTORATE

The 1977 Survey of Doctorate Recipients is the third in a series of biennial studies designed to provide a data base for longitudinal analyses of the composition and utilization of human resources at the doctoral level. Table 1.12 contains trend data on the employment status of doctoral scientists and engineers by field of doctorate for the survey years 1973, 1975, and 1977. Although increasing in numbers, the U.S. doctoral science and engineering population changed little between 1973 and 1977 in terms of employment status by field of Ph.D.

For all fields combined, the proportion of Ph.D.'s employed full-time decreased slightly between 1975 and 1977, moving from 88.8 to 87.9 percent, a decline of 0.9 ± 0.2 percent. Small decreases occurred in a few doctoral fields, with biological sciences and psychology showing declines of 1.8 ± 0.4 and 1.8 ± 0.5 percent, respectively.

Between 1975 and 1977 negligible shifts occurred in other employment status statistics, with few noteworthy changes within fields. In earth

TABLE 1.12 Employment Status by Field of Ph.D. for 1973, 1975, and 1977

	All Fields	Field of Doctorate										
		Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc
1973 EMPLOYMENT STATUS												
Total	233,686	12,849	660	22,061	39,435	7,525	34,780	10,759	5,999	43,415	24,596	31,607
Employed Full-Time	87.2	91.3	97.4	87.7	85.5	89.6	93.8	89.7	85.1	82.9	84.4	86.6
Employed Part-Time	2.6	1.5	0.0	2.3	2.3	2.3	1.3	1.5	3.1	2.8	5.6	3.0
Postdoctoral Appointment	2.4	0.6	0.0	3.8	3.5	1.8	0.8	1.0	3.7	4.9	1.1	0.7
Unemployed, Seeking Employment	1.1	1.3	0.0	1.3	1.6	0.9	0.8	0.5	0.4	1.1	1.1	0.9
Not Employed, Not Seek/Retired	3.6	3.1	0.2	2.8	4.6	2.7	1.4	3.6	3.6	4.9	2.9	4.3
Other/No Report	3.2	2.3	2.4	2.0	2.5	2.9	1.9	3.7	4.2	3.4	4.9	4.5
1975 EMPLOYMENT STATUS												
Total	266,012	14,559	992	24,448	42,387	8,510	40,182	12,182	7,129	48,671	29,204	37,748
Employed Full-Time	88.8	93.1	99.4	88.2	87.2	91.4	95.1	91.8	86.6	82.5	88.2	90.1
Employed Part-Time	2.7	2.1	0.3	1.9	2.3	3.2	1.3	1.6	3.0	2.9	5.8	2.9
Postdoctoral Appointment	3.1	0.8	0.0	4.6	4.1	1.4	0.9	1.9	5.0	6.7	1.5	1.0
Unemployed, Seeking Employment	0.9	0.6	0.2	1.5	1.0	1.1	0.7	0.4	0.5	1.2	0.8	0.9
Not Employed, Not Seek/Retired	4.1	3.3	0.1	3.5	5.1	2.7	1.9	4.2	4.4	6.2	3.2	4.6
Other/No Report	0.3	0.2	0.0	0.3	0.3	0.1	0.1	0.3	0.4	0.5	0.5	0.5
1977 EMPLOYMENT STATUS												
Total	295,827	15,848	1,516	26,425	44,616	9,578	44,329	13,612	8,147	53,548	34,177	44,031
Employed Full-Time	87.9	91.9	99.0	88.4	87.0	90.1	94.6	91.6	85.0	80.7	86.4	89.0
Employed Part-Time	2.4	1.9	0.1	1.9	1.7	2.0	1.0	1.1	2.4	2.4	5.9	2.9
Postdoctoral Appointment	3.3	0.8	0.0	4.5	3.7	3.0	1.0	1.7	5.4	7.8	2.0	1.0
Unemployed, Seeking Employment	1.1	1.1	0.0	1.1	1.1	1.0	0.6	0.5	1.0	1.6	1.2	1.4
Not Employed, Not Seek/Retired	4.3	3.4	0.9	3.3	5.4	3.6	1.9	4.4	4.6	6.4	3.4	4.5
Other/No Report	1.0	0.9	0.0	0.8	1.2	0.3	0.9	0.6	1.5	1.1	1.1	1.2

sciences, the percentage of Ph.D.'s holding postdoctoral appointments increased 1.6 ± 0.6 percent, from 1.4 percent in 1975 to 3.0 percent in 1977. Similarly, 7.8 percent of the doctorates in the biological sciences held postdoctoral appointments in 1977 compared with 6.7 percent in 1975, an increase of 1.1 ± 0.3 percent. This indicates a slight upward trend of postdoctoral appointments for Ph.D.'s in the biological sciences, given the increase that also took place between 1973 and 1975.

Changes in the percentages of unemployed Ph.D.'s seeking work were very small between 1973-1975 and 1975-1977. Differences for those not employed and not seeking work (including those retired) were not statistically significant, with the exception of a small increase of 0.9 ± 0.3 percent in the earth sciences, from 2.7 percent in 1975 to 3.6 percent in 1977.

LONGITUDINAL ANALYSIS OF TYPE OF EMPLOYER BY FIELD OF DOCTORATE

Between 1975 and 1977, the percentage of Ph.D. scientists and engineers employed in four-year colleges and universities declined slightly (Table 1.13). While 55.2 percent of those Ph.D.'s working full-time or part-time in 1975 were employed by four-year institutions, the comparable 1977 figure was 53.9 percent, a decrease of 1.3 ± 0.2 percent. Within certain fields, however, the decline in the percentage of Ph.D.'s employed by four-year colleges or universities was greater. For example, in psychology, agricultural sciences, and mathematics, the decreases in percentage employed by four-year institutions between 1975 and 1977 were 3.3 ± 0.6, 3.3 ± 0.8, and 3.1 ± 0.7 percent, respectively.

Mathematicians and psychologists also reported slight increases in the percentages employed in business and industry, with rises of 1.4 ± 0.4 and 2.1 ± 0.5 percent, respectively, for the period 1975-1977. In the medical sciences, however, a decrease of 2.6 ± 0.4 percent occurred for those employed in business and industry.

Other than these changes, negligible differences were observed in the distribution of Ph.D.'s by fields and employment sector for the 1975-1977 period, and no major shifts were noted between the 1973 and 1975 employment data.

TABLE 1.13 Type of Employer by Field of Ph.D. for 1973, 1975, and 1977

		Field of Doctorate										
	All Fields	Math	Comp	Phys	Chem	Earth	Engr	Agric	Med	Biol	Psych	SocSc
1973 EMPLOYER												
Total	209,808	11,919	643	19,868	34,623	6,912	33,048	9,807	5,289	37,239	22,143	28,317
Educational Institution	57.8	84.4	56.8	51.9	36.6	54.6	39.0	63.2	57.9	69.1	58.7	82.1
4-Year College/Univ	56.0	83.6	55.5	50.3	34.3	53.1	38.4	61.9	56.8	67.2	54.0	80.5
2-Year College	1.3	0.7	1.2	1.4	1.7	1.3	0.5	1.2	0.8	1.6	1.8	1.1
Elem/Secnd School	0.6	0.2	0.0	0.3	0.5	0.1	0.1	0.1	0.3	0.3	2.9	0.5
Federal Government	9.3	4.6	11.5	14.7	6.3	18.6	9.3	19.2	9.0	10.6	6.3	6.0
State/Local Gov't	1.8	0.4	0.0	0.7	0.8	3.1	0.8	2.5	2.9	1.8	5.8	1.7
Hospital/Clinic	2.0	0.1	0.0	0.3	0.7	0.0	0.1	*	4.2	3.0	11.0	0.1
Other Nonprofit Org.	3.5	1.9	2.0	5.5	3.0	2.3	3.8	1.2	3.6	3.5	4.7	3.3
Business/Industry	25.2	8.5	29.7	26.7	52.4	20.9	46.7	13.5	22.0	11.5	12.8	6.0
Other/No Report	0.4	0.1	0.0	0.2	0.2	0.4	0.3	0.3	0.4	0.5	0.6	0.8
1975 EMPLOYER												
Total	243,454	13,855	989	22,016	37,954	8,048	38,719	11,369	6,390	41,544	27,464	35,106
Educational Institution	57.2	82.6	57.0	54.4	36.0	53.4	37.7	60.9	55.8	68.7	56.7	80.1
4-Year College/Univ	55.2	80.9	57.0	52.7	33.4	52.0	37.2	60.1	54.8	66.4	52.2	78.2
2-Year College	1.4	1.4	0.0	1.5	1.9	1.1	0.4	0.8	0.9	1.9	1.4	1.4
Elem/Secnd School	0.7	0.3	0.0	0.3	0.7	0.2	*	*	0.1	0.4	3.1	0.5
Federal Government	8.4	3.9	8.4	11.7	5.4	19.8	9.0	18.5	8.2	9.7	4.6	6.4
State/Local Gov't	1.7	0.4	0.0	0.4	0.8	2.6	0.6	2.3	4.3	2.1	4.1	2.0
Hospital/Clinic	2.8	0.1	0.0	0.5	0.8	*	0.1	0.1	5.6	3.4	16.4	0.2
Other Nonprofit Org.	3.2	1.8	2.0	4.7	2.7	2.8	3.1	1.3	2.5	3.2	4.0	3.5
Business/Industry	26.3	11.0	32.6	28.1	54.1	21.2	49.3	16.3	23.4	12.7	14.0	6.4
Other/No Report	0.4	0.2	0.0	0.2	0.2	0.1	0.2	0.7	0.2	0.2	0.2	1.3
1977 EMPLOYER												
Total	267,206	14,365	1,503	23,876	39,543	8,816	42,367	12,623	7,121	44,494	31,532	40,465
Educational Institution	56.2	80.0	52.7	53.8	35.6	52.0	37.0	58.0	56.4	67.6	54.0	78.5
4-Year College/Univ	53.9	77.8	52.2	52.1	32.9	50.6	36.5	56.8	55.9	65.1	48.9	76.1
2-Year College	1.6	1.9	0.5	1.6	2.2	1.2	0.5	1.2	0.5	2.1	1.9	1.9
Elem/Secnd School	0.6	0.3	0.0	0.1	0.5	0.2	*	*	0.0	0.4	3.3	0.5
Federal Government	8.4	4.3	5.5	11.3	5.6	19.3	9.5	18.7	8.3	9.4	4.6	6.5
State/Local Gov't	1.9	0.4	0.0	0.4	0.9	3.6	0.8	2.7	3.7	2.0	4.7	2.2
Hospital/Clinic	2.9	0.2	0.0	0.7	0.8	0.1	0.1	0.2	5.9	3.7	16.3	0.2
Other Nonprofit Org.	2.9	1.8	3.2	4.7	2.7	1.7	3.3	1.3	2.7	2.2	3.3	3.3
Business/Industry	26.4	12.4	38.7	28.5	53.6	22.1	48.9	18.3	20.8	13.2	16.1	6.7
Other/No Report	1.3	0.9	0.0	0.7	0.8	1.2	0.4	0.7	2.2	1.9	1.0	2.5

CHAPTER II

HUMANITIES

DOCTORAL POPULATION BY FIELDS

Although this is the third report on the characteristics of the nation's doctoral-level scientists and engineers, it is the first report to include Ph.D.'s in the humanities. The Ph.D. fields covered by this chapter (humanities and selected social science fields, hereafter referred to as humanities in the text) are defined as 10 broad fields that are included in the specialties list of Appendix A, i.e., history, art history, music, speech, philosophy, other humanities, English/American literature, classical languages, modern languages and literature, and selected social sciences.[14]

The fields of employment are defined as the same broad fields. The field of employment data, unless otherwise stated, include Ph.D.'s who are on postdoctoral appointments as well as those who are full-time and part-time employed; retired and unemployed persons are excluded. Table 2.1 gives the number of 1934-1976 Ph.D.'s in the humanities in the United States by field

TABLE 2.1 Distribution of Ph.D.'s in the Humanities and Selected Social Sciences in the United States, 1934-1976 Graduates by Field of Doctorate and Field of Employment, 1977

	Field of Doctorate		Field of Employment		
	N	%	N	% of Total Employed	% of Humanities-Employed††
All Fields	79,174	100.0	70,937	100.0	100.0
History	17,259	21.8	11,761	16.6	20.5
Art History	1,451	1.8	1,371	1.9	2.4
Music	3,675	4.6	3,133	4.4	5.5
Speech	3,806	4.8	1,711	2.4	3.0
Philosophy	5,767	7.3	4,136	5.8	7.2
Other Humanities	1,898	2.4	2,431	3.4	4.2
English/American Literature	18,371	23.2	13,272	18.7	23.2
Classical Languages	1,752	2.2	998	1.4	1.7
Modern Languages & Lit.	11,457	14.5	8,519	12.0	14.9
Social Sciences	13,738	17.4	9,920	14.0	17.3
Other			11,041	15.6	
No Report			2,644	3.7	

†Includes postdoctoral appointees as well as full-time and part-time employed.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
††Percentages are based on the estimated number of individuals employed in the humanities and selected social sciences (N = 57,252).

[14] The selected social science fields include only those fine fields that are of special interest to the National Endowments for the Humanities; i.e., archeology, linguistics, area studies, political science, public administration, and international relations.

of doctorate and field of employment as of February 1977. Table 2.1 also gives the percentages of Ph.D.'s by field for those employed in the humanities only.

The fields with the highest number of doctorate recipients were English/American literature (23.2 ± 0.2 percent)[15] and history (21.8 ± 0.1 percent). Although the number of Ph.D.'s employed was smaller than the number of individuals awarded doctorates, the fields with the highest percentage of employment for humanities Ph.D.'s remained English/American literature (18.7 ± 0.3 percent) and history (16.6 ± 0.3 percent).

A comparison between field of doctorate and field of employment for the humanities shows that net losses occurred from receipt of Ph.D. degree to employment in all fields except "other humanities." There were substantial net losses in the fields of history, English/American literature, and the social sciences.

One apparent reason for the decline in numbers from Ph.D. field to employment field is the large percentage of humanities graduates who entered the education field. Appendix F provides further statistics on the estimated number of Ph.D.'s in the humanities who were employed in each fine-field category and shows how the 15.6 ± 0.4 percent in the "other" category were distributed.

FIELD MOBILITY OF EMPLOYED PH.D.'S

Of the 79,200 Ph.D.'s in the humanities who received their doctorates from January 1934 through June 1976 (Table 2.1), approximately 70,900 were employed in February 1977. Table 2.2 contains data on the movement of individuals with Ph.D.'s in the humanities from doctorate field to employment field.

The Ph.D. fields retaining the highest percentage of their doctorates in the corresponding employment field were music (88.8 ± 1.3 percent) and art history (84.9 ± 2.0 percent). These data, like those in Table 2.1, show

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[15] The figure, 0.2 percent, is the sampling error associated with the estimate of 23.2 percent. See page 5 for an explanation of sampling error and how it can be converted to a confidence interval.

relative stability from field of Ph.D. to field of employment. Not only did music and art history retain their graduates, but apparently they employed few doctorates from other fields.

TABLE 2.2 Field Mobility of Employed Ph.D.'s in the Humanities and Selected Social Sciences, 1977

		Field of Employment											
Field of Doctorate	Total Employed+	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas- sics	Modrn Lang	SocSc	Other	No Report
All Fields	70,937	11,761	1,371	3,133	1,711	4,136	2,431	13,272	998	8,519	9,920	11,041	2,644
History	15,636	71.6	0.5	0.1	0.0	1.2	3.0	1.5	0.1	0.2	3.3	14.7	3.9
Art History	1,315	0.8	84.9	0.0	1.2	0.0	1.1	0.0	0.5	0.0	0.5	7.3	3.9
Music	3,463	0.0	0.1	88.8	0.3	0.0	2.1	0.1	0.0	0.1	0.0	5.3	3.2
Speech	3,507	0.5	0.2	0.0	45.5	0.0	2.5	2.5	0.0	0.6	0.1	45.1	3.1
Philosophy	5,121	1.0	0.2	0.0	0.0	75.5	0.4	0.0	0.0	0.5	0.1	17.9	4.4
Other Humanities	1,634	3.1	4.2	1.5	0.1	1.3	39.4	8.9	0.4	14.1	5.0	17.3	4.8
English/American Literature	16,246	1.1	0.0	0.0	0.6	#	4.0	75.6	0.1	1.8	1.0	12.6	3.3
Classical Languages	1,491	2.1	0.6	0.0	0.0	1.9	4.6	2.3	60.5	3.9	2.1	17.8	4.2
Modern Languages & Lit.	9,761	0.8	0.2	0.2	0.0	0.2	3.0	3.3	0.3	76.2	1.2	9.7	5.0
Social Sciences*	12,763	1.2	0.5	0.0	0.0	0.1	0.9	1.3	0.2	3.3	70.5	19.1	3.0

+Includes postdoctoral appointees as well as full-time and part-time employed.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
#Less than 0.1 percent.

Speech and "other humanities" retained the smallest percentage of their Ph.D.'s (45.5 ± 2.4 and 39.4 ± 2.1 percent, respectively). Nearly half (45.1 ± 2.4 percent) of the Ph.D.'s in speech entered employment fields outside the humanities. Ph.D.'s in "other humanities" moved most frequently into employment fields such as modern languages and literature (14.1 ± 1.9 percent), English/American literature (8.9 ± 1.7 percent), and nonhumanities fields (17.3 ± 2.0 percent).

Ph.D.'s in classical languages and literature also had a low retention rate (60.5 ± 2.6 percent) and a high percentage of field-switching to nonclassical languages and literature, "other humanities," and nonhumanities employment.

DEMOGRAPHIC CHARACTERISTICS BY FIELD OF DOCTORATE

Table 2.3 shows that approximately 78 percent (78.1 ± 0.1 percent) of the Ph.D.'s in the humanities were men. Women Ph.D.'s were most highly represented in the fields of art history (40.5 ± 0.9 percent) and modern languages

(35.3 ± 0.3 percent). The difference in the proportion of males and females was greatest in the fields of philosophy and the selected social sciences, in which men represented nearly 87 percent of the field and women represented slightly over 13 percent.

TABLE 2.3 Demographic Characteristics by Field of Humanities and Selected Social Sciences Doctorate, 1977

		Field of Doctorate									
Demographic Characteristics	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*
Total Population	79,174	17,259	1,451	3,675	3,806	5,767	1,898	18,371	1,752	11,457	13,738
Sex	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Male	78.1	85.7	59.5	84.1	82.6	86.5	69.8	70.9	73.2	64.7	86.6
Female	21.9	14.3	40.5	15.9	17.4	13.5	30.2	29.1	26.8	35.3	13.4
Racial Group	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White/Caucasian	88.3	87.4	91.1	86.9	86.2	88.8	84.0	90.3	88.7	86.8	88.9
Minority Group+	3.2	3.1	1.6	4.4	2.4	3.3	5.9	1.9	2.2	2.9	4.9
No Report	8.5	9.5	7.3	8.7	11.4	7.8	10.1	7.8	9.1	10.3	6.1
Age in Survey Year	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Under 30	1.6	0.9	2.6	2.1	0.3	2.9	1.0	2.0	1.5	1.5	1.3
30-34	14.8	13.8	15.2	10.1	8.5	19.6	13.6	15.1	18.0	14.1	16.8
35-39	20.5	22.1	22.2	19.6	15.8	21.0	16.6	20.2	17.6	19.9	21.4
40-44	15.8	16.4	13.9	18.4	14.5	16.0	14.3	16.4	13.4	15.4	14.8
45-49	13.3	13.1	13.9	16.3	17.3	10.4	14.9	13.3	10.3	12.5	13.4
50-54	9.9	8.7	9.2	11.5	14.3	10.1	11.4	9.9	8.3	9.5	10.3
55-59	9.4	10.2	6.6	10.3	13.1	8.3	12.4	8.1	7.7	8.5	10.1
60-64	5.9	6.6	8.1	5.9	6.6	3.7	5.8	5.2	7.8	7.1	5.4
Over 64	7.7	7.1	7.3	4.5	7.0	6.8	9.4	8.5	14.3	9.9	6.2
No Report	1.1	1.1	1.1	1.2	2.7	1.1	0.6	1.2	1.2	1.5	0.3
Calendar Year of Ph.D.	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1934-39	3.2	2.9	1.1	0.3	1.7	3.4	3.6	3.3	9.4	4.2	3.0
1940-44	2.9	3.1	2.2	0.9	1.9	3.6	3.0	3.0	6.2	3.8	2.2
1945-49	3.0	3.6	1.9	2.0	3.0	2.9	2.3	2.8	4.6	3.2	2.4
1950-54	7.5	8.6	5.7	5.1	9.9	6.9	6.8	6.9	7.4	6.8	7.8
1955-59	8.0	8.2	10.2	8.5	11.1	8.0	7.0	6.8	7.7	7.5	8.6
1960-64	11.1	11.0	10.1	14.1	17.1	11.9	9.3	10.9	12.5	8.2	11.4
1965-69	20.4	20.5	19.5	17.1	24.3	18.0	14.2	22.0	10.1	19.5	20.7
1970-74	33.7	32.6	34.1	37.2	27.6	33.7	43.5	34.5	25.2	34.1	34.0
1975-76 #	10.3	9.5	15.2	14.7	3.4	11.6	10.4	9.7	7.9	12.7	9.9
Citizenship	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
U.S.	96.0	96.8	95.7	96.6	96.2	95.8	94.4	97.2	95.1	92.7	96.6
Foreign##	2.5	1.7	2.3	1.6	0.6	2.9	4.6	1.1	3.1	5.6	2.8
No Report	1.5	1.5	2.0	1.8	3.2	1.2	1.1	1.7	1.8	1.7	0.6

+Includes Black, American Indian, and Asian.
#Excludes Ph.D.'s awarded in July-December 1976.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
##In view of the lack of a comprehensive sampling frame for foreign-earned doctorates in the United States, data regarding this group may be somewhat underestimated.

Members of racial minority groups (i.e., Blacks, American Indians, and Asians) comprised 3.2 ± 0.1 percent of the humanities doctoral population.[16] Fields with relatively high percentages of minority group members were "other humanities" (5.9 ± 0.8 percent), selected social sciences (4.9 ± 0.5 percent), and music (4.4 ± 0.6 percent). The lowest percentages of minority participation were in the fields of art history (1.6 ± 0.4 percent) and English/American literature (1.9 ± 0.2 percent). With reference to numbers, however, the fields with the largest participation of minority members were selected social sciences (677), history (540), English/American literature (351), and modern languages (328).

Review of the age distribution of humanities doctorates in the U.S. shows small differences among fields. Approximately two of every five Ph.D.'s in philosophy (43.6 ± 1.5 percent), art history (40.0 ± 1.9 percent), and selected social sciences (39.5 ± 1.1 percent) were under 40. The fields which had the highest percentages of over-40 Ph.D.'s were speech (72.8 ± 1.8 percent and "other humanities" (68.2 ± 2.1 percent).

The distribution of years in which Ph.D.'s were awarded indicates the relative growth of the humanities fields over the years. Since 1970, music (51.9 ± 0.6 percent), art history (49.3 ± 1.1 percent), and those fields comprising "other humanities" (53.9 ± 2.0 percent) have shown substantial growth in terms of overall percentage of Ph.D.'s within the field. The fields with the slowest rates of growth in Ph.D.'s since 1970 were speech and classical languages and literature (31.0 ± 1.0 and 33.1 ± 1.0 percent, respectively).

Foreign citizens were most highly represented in modern languages (5.6 ± 0.5 percent) and "other humanities" (4.6 ± 1.0 percent). In speech, as may be expected, only 0.6 ± 0.3 percent of the Ph.D.'s were foreign citizens.

EMPLOYMENT STATUS BY FIELD OF DOCTORATE

Of the 79,200 Ph.D.'s in the humanities in the United States, approximately 66,500 (84.1 ± 0.3 percent) were employed in full-time jobs (Table 2.4A). An additional 3,600 (4.6 ± 0.2 percent) doctorates in the humanities reported

[16] It should be noted that these figures may reflect a bias due to the high percentage of nonresponse to the racial/ethnic question.

that they were employed on a part-time basis, and as few as 800 (1.0 ± 0.1 percent) indicated they held postdoctoral appointments (i.e., fellowship, traineeship, research associateship) in February 1977.

TABLE 2.4A 1977 Employment Status of Ph.D.'s in the Humanities and Selected Social Sciences

1977 Employment Status	All Fields	Field of Doctorate									
		Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*
Total Population	79,174	17,259	1,451	3,675	3,806	5,767	1,898	18,371	1,752	11,457	13,738
Employed Full-Time	84.1	85.9	81.8	87.1	88.8	83.0	80.6	82.5	78.2	78.6	88.1
Humanities/Selected Social Sciences	68.4	70.6	73.3	80.5	45.9	65.7	63.3	70.5	61.2	67.5	69.0
Other/Unknown Field	15.6	15.3	8.5	6.6	42.9	17.3	17.2	12.0	17.0	11.1	19.1
Employed Part-Time	4.6	3.6	5.5	6.7	3.4	4.6	5.3	5.2	5.8	5.7	3.2
Humanities/Selected Social Sciences	3.1	2.5	5.3	5.3	1.8	2.4	3.6	3.3	4.3	4.4	2.1
Other/Unknown Field	1.4	1.1	0.2	1.4	1.5	2.2	1.7	1.9	1.5	1.3	1.1
Postdoctoral Appointment**	1.0	1.0	3.3	0.4	0.0	1.3	0.2	0.7	1.1	0.9	1.6
Not Employed+	9.6	8.8	8.6	5.1	7.6	10.8	11.8	10.5	14.9	14.0	6.0
Seeking Employment	2.7	2.7	3.7	2.2	0.8	4.3	3.1	3.0	2.6	3.8	1.3
Not Seeking	1.4	1.0	0.8	0.6	0.7	1.4	2.1	1.8	3.4	2.4	0.9
Retired	5.4	5.1	4.1	2.3	6.0	5.0	6.7	5.8	8.9	7.7	3.8
Other	0.3	0.3	0.6	0.3	#	0.3	1.1	0.5	0.0	0.5	#
No Report	0.5	0.3	0.2	0.4	0.3	0.1	1.0	0.5	0.0	0.3	1.1

*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
+Percentages are not unemployment rates, since the percentages presented here are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, all of whom may not be part of the labor force. For unemployment rates, see Table 2.11.
#Less than 0.1 percent.
**The percentages of postdoctorals may be underestimates, since the sources of information about foreign Ph.D.'s who came to the U.S. for postdoctoral study are incomplete.

Those Ph.D.'s in the humanities unemployed and seeking employment (2,100), together with the full-time and part-time employed and the postdoctoral appointees, constitute the labor force (73,100, or 92.3 ± 0.2 percent of the total population of Ph.D. humanists). Those Ph.D.'s who indicated they were not employed and not seeking employment, who were retired, or who gave no report on their employment status constitute the remainder of the humanities population (6,100, or 7.7 ± 0.2 percent of the total population of Ph.D. humanists).

Ph.D.'s in music reported the highest percentage of full-time employment in the humanities fields--80.5 ± 1.5 percent for 1934-1976 doctorates. The

fields with the highest total percentage of doctorates employed full-time in humanities as well as other fields were speech (88.8 ± 1.0 percent), selected social sciences (88.1 ± 0.8 percent), and music (87.1 ± 1.3 percent) (Table 2.4A).

Although Ph.D.'s in speech reported one of the highest overall percentages of full-time employment, they had a relatively high percentage of degree holders employed full-time in other/unknown fields (42.9 ± 2.3 percent). This trend also held true for the 1971-1976 Ph.D.'s in speech, who reported 36.8 ± 3.9 percent full-time employment in fields other than the humanities (Table 2.4B).

TABLE 2.4B 1977 Employment Status of Ph.D.'s in the Humanities and Selected Social Sciences, 1971-1976 Graduates

		Field of Doctorate									
1977 Employment Status	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*
Total Population	32,491	6,834	654	1,839	1,112	2,380	982	7,500	508	5,039	5,643
Employed Full-Time	84.8	87.0	84.1	87.1	91.8	80.3	83.4	81.8	81.1	80.3	90.6
Humanities/Selected Social Sciences	69.6	68.0	80.1	82.7	55.0	66.0	65.3	70.3	72.8	68.1	71.1
Other/Unknown Field	15.3	19.1	4.0	4.4	36.8	14.3	18.1	11.5	8.3	12.2	19.5
Employed Part-Time	6.6	5.4	6.3	8.9	4.4	6.0	7.9	8.8	7.3	8.7	2.7
Humanities/Selected Social Sciences	4.9	4.0	6.3	7.6	2.9	3.4	5.1	6.1	6.1	7.1	2.4
Other/Unknown Field	1.6	1.4	0.0	1.4	1.5	2.6	2.9	2.7	1.2	1.5	0.3
Postdoctoral Appointment**	1.4	1.0	3.1	0.0	0.0	2.0	0.4	1.0	1.6	1.1	3.2
Not Employed+	6.4	5.9	6.6	4.0	2.8	10.9	6.2	7.0	10.0	8.8	3.3
Seeking Employment	4.6	4.6	5.5	3.6	1.8	8.3	4.1	4.7	5.5	6.2	2.1
Not Seeking	1.8	1.3	1.1	0.4	1.0	2.6	2.1	2.1	4.5	2.7	1.0
Retired	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Other	0.4	0.3	0.0	0.0	0.1	0.8	0.7	0.9	0.0	0.5	0.0
No Report	0.4	0.3	0.0	0.0	0.9	0.0	1.3	0.5	0.0	0.5	0.2

*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.

**The percentages of postdoctorals may be underestimates, since the sources of information about foreign Ph.D.'s who came to the U.S. for postdoctoral study are incomplete.

+Percentages are not unemployment rates, since the percentages presented here are calculated on the total population, which includes those retired, those not seeking employment, and those not reporting status, all of whom may not be part of the labor force. For unemployment rates, see Table 2.11.

There were slight differences among fields in the percentages of Ph.D.'s in the humanities who were part-time employed; 4.6 ± 0.2 percent of the total reported part-time employment.

Similarities were noted between total and recent cohorts in the percentages of Ph.D.'s who reported holding postdoctoral appointments. In the field of art history, both groups reported over 3 percent holding postdoctoral appointments (3.3 ± 0.9 percent for 1934-1976 graduates and 3.1 ± 1.3 percent for 1971-1976 graduates). Recent social science degree holders also reported 3.2 ± 0.9 percent holding postdoctoral appointments.

The percentage of humanities doctorates unemployed and seeking employment was relatively high for Ph.D.'s in philosophy--4.3 ± 0.8 percent of the total group and 8.3 ± 1.7 percent of the recent doctorate recipients.[17] Classical language Ph.D.'s had the highest percentage who were unemployed and no longer seeking jobs--3.4 ± 0.8 percent for the total group and 4.5 ± 1.3 percent for the 1971-1976 doctorate recipients.

TYPE OF EMPLOYER BY FIELD OF EMPLOYMENT

In the humanities there were an estimated 70,200 Ph.D.s who were employed full-time or part-time in the U.S. in 1977. About 88.0 ± 0.4 percent of these individuals were working at educational institutions, including 6.8 ± 0.3 percent who reported two-year colleges or elementary and secondary schools (Table 2.5A).

Most of the Ph.D.'s in philosophy (93.1 ± 1.2 percent) and classics (92.4 ± 1.6 percent) held positions at four-year colleges and universities. Only a small percentage of individuals working in these fields was employed outside educational institutions.

In art history, those Ph.D.'s employed outside educational institutions included 8.7 ± 1.8 percent who were working for museums and historical societies.

Of the Ph.D.'s employed in the selected social sciences, 9.0 ± 1.0 percent were working for the federal government. In each of the humanities

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[17] It should be noted that these figures are not unemployment rates, since they are based on the total population rather than the number in the labor force. Unemployment rates for philosophy and other fields are given in Table 2.11. The unemployment rate for humanities doctorates is 2.9 percent.

fields, however, the proportion employed by the U.S. government never exceeded 2.0 percent.

TABLE 2.5A Type of Employer by Field of Employment for Full-Time and Part-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences, Excluding Postdoctoral Appointees, 1977

		Field of Employment											
1977 Employer	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas- sics	Modrn Lang	SocSc*	Other	No Report
Employed Population+	70,152	11,643	1,334	3,117	1,711	4,090	2,400	13,185	980	8,445	9,734	10,927	2,586
Educational Institution	88.0	95.5	88.9	93.6	96.6	99.0	84.1	99.4	100.0	98.0	84.1	61.3	60.5
4-Year College/Univ	81.2	86.9	88.3	85.8	89.5	93.1	75.6	91.3	92.4	91.6	81.8	52.6	56.0
2-Year College	4.7	6.5	0.6	5.5	6.5	5.8	6.5	6.1	3.1	3.6	1.8	3.7	3.2
Elem/Secnd School	2.2	2.1	0.0	2.3	0.6	0.1	2.0	1.9	4.5	2.8	0.4	4.9	1.4
U.S. Government	2.6	1.8	0.3	0.0	0.0	0.6	1.6	0.1	0.0	0.5	9.0	5.1	3.2
State/Local Government	1.1	0.4	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.2	2.2	3.5	2.2
Private Foundation	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	#	0.5	1.0	0.0
Museum/Historical Society	0.5	1.3	8.7	0.0	0.0	0.0	1.2	0.0	0.0	0.1	0.1	0.4	0.3
Research Library/Archives	0.3	0.3	0.4	0.0	0.0	0.0	6.6	0.0	0.0	0.2	0.0	0.1	0.0
Business/Industry	3.7	0.5	1.4	2.1	2.0	0.3	1.0	0.4	0.0	0.9	1.5	16.9	8.6
Other	2.8	0.2	0.2	4.4	1.3	0.0	2.3	0.1	0.0	#	2.6	11.6	6.7
No Report	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	18.5

+Excluded from this table are 9,022 individuals who are postdoctoral appointees, are not employed, or did not report employment status.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
#Less than 0.1 percent.

There were approximately 10,900 individuals who earned doctorates in the humanities but who were employed outside these fields in 1977. Of this group, 15.9 ± 1.1 percent were employed in the business and industry sector, including those self-employed.

Table 2.5B shows the percentage distribution by type of employer for the 1971-1976 graduates only. In comparison with the humanities Ph.D.'s from all years of graduation (1934-1976), the recent doctorate recipients were more frequently found to be working in two-year colleges and elementary and secondary schools. For example, 15.3 ± 1.8 percent of the historians who earned doctorates in the period 1971-1976 were employed by two-year colleges and elementary and secondary schools in 1977; for the combined 1934-1976 Ph.D.'s, the proportion was 8.6 ± 0.9 percent. Two-year colleges employed 8.5 ± 1.9 percent of the recent Ph.D.'s in music, 8.8 ± 2.7 percent of those in speech, and 9.6 ± 1.3 percent of those in English and American literature.

TABLE 2.5B Type of Employer by Field of Employment for Full-Time and Part-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences, 1971-1976 Graduates, Excluding Postdoctoral Appointees, 1977

		Field of Employment											
1977 Employer	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*	Other	No Report
Employed Population+	29,687	4,414	689	1,646	589	1,713	1,244	5,605	351	3,758	4,194	4,628	856
Educational Institution	85.0	91.3	86.8	91.6	91.9	98.4	81.5	98.6	100.0	97.4	80.6	53.2	55.7
4-Year College/Univ	75.0	76.1	86.8	79.8	83.0	91.1	69.6	85.6	86.0	89.4	77.1	43.1	47.5
2-Year College	6.6	10.9	0.0	8.5	8.8	6.9	8.1	9.6	3.1	4.6	3.0	3.8	5.7
Elem/Secnd School	3.3	4.4	0.0	3.3	0.0	0.4	3.8	3.4	10.8	3.4	0.5	6.3	2.5
U.S. Government	3.1	3.1	0.6	0.0	0.0	0.9	0.6	0.2	0.0	0.4	9.8	6.0	6.1
State/Local Gov't	1.7	0.6	0.0	0.0	0.0	0.0	4.4	0.0	0.0	0.2	3.2	5.2	2.5
Private Foundation	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.9	0.4	0.0
Museum/Historical Society	0.9	2.9	11.5	0.0	0.0	0.0	2.3	0.0	0.0	0.1	0.0	0.6	0.0
Research Library/Archives	0.5	0.6	0.0	0.0	0.0	0.0	7.7	0.0	0.0	0.4	0.0	#	0.0
Business/Industry	5.0	1.0	0.7	1.6	4.8	0.8	1.5	1.0	0.0	1.3	1.6	22.5	14.6
Other	3.2	0.4	0.4	6.7	3.4	0.0	1.9	0.3	0.0	0.0	3.8	11.9	4.6
No Report	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	16.6

+Excluded from this tables are 2,804 individuals who are postdoctoral appointees, are not employed, or did not report employment status.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
#Less than 0.1 percent.

In all of the humanities fields, the recent Ph.D.'s held positions at four-year colleges and universities less frequently than did the 1934-1976 humanities doctorates. The proportion of 1971-1976 Ph.D.'s who were employed by four-year colleges and universities was 75.0 ± 0.7 percent compared with 81.2 ± 0.4 percent for the total Ph.D. group.

PRIMARY WORK ACTIVITY BY FIELD OF EMPLOYMENT

Teaching was the primary work activity reported by two-thirds of the Ph.D.'s in the humanities who were employed full-time or part-time in 1977 (Table 2.6A). About 13 percent (12.9 ± 0.4 percent) of those employed were engaged primarily in management and administration in 1977, while 5.2 ± 0.3 percent held research positions. Writing and editing were cited as primary work activities by only 4.5 ± 0.2 percent.

In the fields of English and American literature, classical languages, and modern languages, more than 80 percent of those employed identified teaching as their primary work activity. For the selected social science fields, the proportion teaching was only 61.9 ± 1.6 percent. A relatively high percentage of individuals employed in the social sciences held research positions (11.5 ± 1.1 percent compared with 5.2 ± 0.3 percent for all fields combined).

TABLE 2.6A Primary Work Activity by Field of Employment for Full-Time and Part-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences, Excluding Postdoctoral Appointees, 1977

1977 Primary Work Activity	All Fields	Field of Employment: Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas- sics	Modrn Lang	SocSc*	Other	No Report
Employed Population+	70,152	11,643	1,334	3,117	1,711	4,090	2,400	13,185	980	8,445	9,734	10,927	2,586
Teaching	67.0	79.0	70.9	77.9	74.2	77.8	53.1	84.3	82.6	82.3	61.9	27.3	31.0
Research	5.2	5.9	5.1	0.4	1.1	7.0	3.1	2.8	6.7	3.5	11.5	5.2	4.1
Consulting/Prof. Services	2.5	0.6	0.4	1.3	1.5	0.6	5.2	0.1	0.0	0.6	2.7	10.0	1.8
Management/Administration	12.9	5.8	14.4	9.4	12.9	5.1	27.1	5.2	4.0	5.6	15.5	35.2	9.7
Design/Development	0.7	0.4	1.3	0.9	0.8	0.3	2.0	0.7	0.7	0.6	0.2	1.1	1.1
Writing/Editing	4.5	5.7	4.6	2.1	2.8	5.2	2.6	4.1	2.0	3.2	4.0	6.7	4.3
Marketing/Production/ Inspection	0.8	0.1	0.3	1.0	3.2	0.2	0.5	0.1	0.0	#	0.0	3.7	1.7
Other	2.5	0.5	0.1	4.3	2.2	0.6	3.5	0.6	0.3	0.9	2.2	7.7	7.0
No Report	3.9	1.9	2.8	2.7	1.3	3.2	3.0	2.2	3.7	3.2	2.0	3.2	39.3

+Excluded from this table are 9,022 individuals who are postdoctoral appointees, are not employed, or did not report employment status.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
#Less than 0.1 percent.

Approximately 10,900 individuals who earned Ph.D.'s in the humanities were employed outside the humanities fields in 1977. Of this group, 35.2 ± 1.4 percent were managers or administrators, while another 10.0 ± 0.9 percent were in consulting or professional services.

Table 2.6B contains data on the primary work activities of Ph.D.'s in the humanities who earned their doctorates in the period 1971-1976. In general, the employment activities of the recent graduates (Table 2.6B) did not differ greatly from those reported for the total 1934-1976 graduates (Table 2.6A). For example, the proportion of Ph.D. philosophers who were teaching was 83.2 ± 2.8 percent for recent graduates compared with 77.8 ± 2.0 percent for the total Ph.D. group. Compared with the total 1934-1976 graduates, a smaller proportion of recent Ph.D.'s held management positions. While 9.1 ± 0.5 percent of the 1971-1976 doctorate recipients cited management and administration, 12.9 ± 0.4 percent of the total 1934-1976 Ph.D.'s reported these activities.

TABLE 2.6B Primary Work Activity by Field of Employment for Full-Time and Part-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences, 1971-1976 Graduates, Excluding Postdoctoral Appointees, 1977

1977 Primary Work Activity	All Fields	Field of Employment											
		Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*	Other	No Report
Employed Population+	29,687	4,414	689	1,646	589	1,713	1,244	5,605	351	3,758	4,194	4,628	856
Teaching	69.5	81.2	72.4	77.8	77.8	83.2	55.6	88.2	91.5	84.4	65.6	27.2	30.5
Research	5.0	6.3	3.6	0.4	1.4	4.1	2.7	2.0	3.1	3.4	12.0	5.8	4.9
Consulting/Prof. Services	3.0	1.2	0.9	2.6	0.8	0.6	6.6	0.0	0.0	0.6	3.4	11.0	2.8
Management/ Administration	9.1	3.1	13.2	6.9	6.1	2.3	24.4	3.3	0.6	3.5	10.7	24.6	9.1
Design/Development	0.7	0.1	1.2	0.6	0.5	0.3	3.3	0.6	0.0	0.7	0.0	1.2	1.6
Writing/Editing	4.7	6.2	4.5	1.3	3.4	5.5	1.4	3.0	1.1	3.6	3.9	9.6	3.3
Marketing/Production/ Inspection	1.4	0.4	0.6	1.3	5.3	0.6	1.0	0.2	0.0	0.1	0.0	6.5	1.2
Other	3.1	0.3	0.0	7.5	4.8	0.1	3.1	0.0	0.9	1.4	2.5	10.0	11.9
No Report	3.4	1.2	3.6	1.6	0.0	3.4	2.0	2.6	2.8	2.3	1.9	4.1	34.7

+Excluded from this table are 2,804 individuals who are postdoctoral appointees, are not employed, or did not report employment status.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.

ACADEMIC RANK BY COHORT, FIELD OF DOCTORATE, AND SEX

Table 2.7 shows the percentage distribution of doctorates in the humanities who were employed in U.S. colleges and universities in 1977 by sex, field of Ph.D., year of Ph.D., and academic rank.

The percentage of Ph.D.'s in the humanities who held full professorships was higher for males than for females in all graduation cohorts. The greatest discrepancy occurred for the 1950-1959 Ph.D.'s, where 87.0 ± 1.1 percent of the men reported that they held full professorships, compared with 58.0 ± 3.5 percent of the women who reported that rank (Table 2.7). Within the 1950-1959 cohorts, the numbers of women doctorates in most fields are too small to permit comparisons of the proportions of men and women in specific fields who held full professorships.

Within the 1960-1969 cohort, the most populous, 47.5 ± 1.1 percent of the men and 31.0 ± 1.8 percent of the women were full professors. Distribution of rank varied from field to field. In music, 66.2 ± 4.0 percent of the men held full professorships, while in modern languages and literature 35.6 ± 2.5 percent of the men held this rank. For women, only 17.4 ± 5.0 percent in the

TABLE 2.7 Rank For Academically Employed Ph.D.'s in the Humanities and Selected Social Sciences by Cohort, Field of Doctorate, and Sex, 1977

Ph.D. Cohort and Rank	Field of Doctorate and Sex																					
	All Fields		History		Art History		Music		Speech		Philosophy		Other Human		Eng/Am Lit		Classical Lang & Lit		Modern Lang & Lit		Social Sci*	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Total, 1934-1949 Ph.D.'s	2,504	432	666	94	22	9	67	6	49	6	202	45	55	7	491	112	115	60	376	58	461	35
Professor	84.7	76.6	86.6	92.6	90.9	55.6	85.1	100.0	83.7	33.3	85.1	80.0	80.0	57.1	88.4	80.4	79.1	53.3	85.1	67.2	79.0	85.7
Associate Professor	5.3	10.9	8.1	7.4	0.0	0.0	6.0	0.0	0.0	0.0	0.0	6.7	18.2	42.9	3.7	13.4	12.2	20.0	7.2	12.1	1.1	0.0
Assistant Professor	0.6	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.4	3.5	0.0
Instructor, Lecturer, Other	2.4	7.4	1.7	0.0	0.0	0.4	0.0	0.0	14.3	0.0	0.0	13.3	0.0	0.0	1.8	6.3	0.0	20.0	1.9	5.2	5.9	0.0
No Rank Reported	7.0	4.6	3.6	0.0	9.1	0.0	9.0	0.0	2.0	66.7	14.9	0.0	1.8	0.0	6.1	0.0	8.7	6.7	5.9	12.1	10.6	14.3
Total, 1950-1959 Ph.D.'s	8,865	1,039	2,170	188	131	34	379	27	568	71	702	49	184	36	1,943	262	152	35	1,085	234	1,551	103
Professor	87.0	58.0	88.8	58.0	92.4	61.8	81.8	48.1	84.9	45.1	80.1	73.5	77.7	83.3	88.9	56.9	75.7	48.6	84.1	61.1	90.8	51.5
Associate Professor	7.2	25.3	5.9	26.6	7.6	26.5	11.3	25.9	6.2	28.2	12.5	22.4	9.2	5.6	6.0	25.6	16.4	22.9	9.7	23.5	4.4	33.0
Assistant Professor	1.1	3.7	1.2	0.0	0.0	5.9	0.0	0.0	1.8	7.0	2.0	0.0	0.0	0.0	0.8	7.3	0.0	0.0	1.8	5.1	0.6	0.0
Instructor, Lecturer, Other	1.7	8.8	1.1	11.7	0.0	5.9	2.4	11.1	1.9	19.7	0.0	0.0	1.6	11.1	2.5	6.9	0.0	28.6	1.8	5.1	2.3	5.8
No Rank Reported	3.1	4.2	2.9	3.7	0.0	0.0	4.5	14.8	5.3	0.0	5.4	4.1	11.4	0.0	1.8	3.4	7.9	0.0	2.8	5.1	1.9	9.7
Total, 1960-1969 Ph.D.'s	17,925	3,575	4,364	440	232	121	899	115	1,218	212	1,319	178	291	76	4,168	1,249	383	69	1,975	763	3,076	352
Professor	47.5	31.0	49.3	25.9	49.1	39.7	66.2	40.0	55.1	43.4	41.7	32.0	57.0	48.7	44.2	32.5	48.3	17.4	35.6	26.0	50.2	28.4
Associate Professor	41.7	44.3	39.1	47.7	43.1	37.2	26.6	34.8	39.4	35.4	39.6	53.9	36.4	34.2	42.1	41.8	45.4	37.7	52.6	47.7	43.8	50.6
Assistant Professor	6.2	14.0	6.2	16.6	2.2	15.7	3.6	18.3	1.8	9.0	11.0	2.2	0.3	14.5	8.9	13.1	2.9	23.2	7.3	18.1	3.3	9.7
Instructor, Lecturer, Other	2.1	5.4	2.5	4.5	0.0	2.5	1.9	2.6	0.9	6.6	5.2	6.2	4.8	2.6	0.6	5.4	1.6	17.4	2.6	5.4	2.1	5.4
No Rank Reported	2.6	5.3	2.9	5.2	5.6	5.0	1.8	4.3	2.8	5.7	2.6	5.6	1.4	0.0	4.2	7.1	1.8	4.3	1.9	2.9	0.5	6.0
Total, 1970-1974 Ph.D.'s	15,733	4,993	3,302	631	220	208	991	198	713	154	1,427	186	423	227	3,527	1,654	251	72	1,917	1,095	2,962	568
Professor	7.0	4.6	7.2	5.9	2.3	6.3	16.2	19.7	17.3	7.1	5.7	0.0	9.5	3.1	5.1	4.5	3.2	0.0	4.2	2.1	6.5	4.8
Associate Professor	38.9	25.7	44.0	28.4	38.2	22.1	39.0	23.2	40.4	20.1	32.2	20.4	32.9	20.3	36.1	29.0	33.9	13.9	35.9	22.6	42.7	28.5
Assistant Professor	44.9	51.2	38.8	37.9	53.6	58.2	30.4	41.9	33.7	47.4	54.7	53.2	48.2	50.2	48.9	48.6	60.2	77.8	55.7	58.4	40.4	57.9
Instructor, Lecturer, Other	5.6	13.8	7.7	18.5	3.2	9.1	11.0	9.1	4.8	14.9	5.8	16.7	5.9	19.8	4.1	15.6	2.8	5.6	2.1	12.6	6.0	6.7
No Rank Reported	3.6	4.6	2.4	9.4	2.7	4.3	3.4	6.1	3.9	10.4	1.7	9.7	3.5	6.6	5.8	2.4	0.0	2.8	2.1	4.2	4.4	2.1
Total, 1975-1976 Ph.D.'s	3,720	1,984	801	255	73	78	309	80	80	21	402	88	95	65	723	647	73	36	538	511	626	203
Professor	2.3	1.1	6.6	0.4	0.0	0.0	2.6	6.3	0.0	0.0	0.0	0.0	9.5	6.2	0.4	0.5	0.0	0.0	1.9	1.6	0.6	0.5
Associate Professor	12.4	8.6	17.4	6.3	13.7	12.8	31.1	16.3	17.5	0.0	7.2	13.6	10.5	21.5	12.4	6.8	0.0	0.0	7.1	10.0	5.9	5.4
Assistant Professor	65.4	60.1	54.9	58.4	75.3	62.8	50.8	45.0	76.3	90.5	68.4	64.8	65.3	52.3	63.2	59.0	80.8	61.1	77.3	61.1	72.0	65.0
Instructor, Lecturer, Other	15.6	27.0	19.1	27.8	11.0	20.5	8.7	32.5	6.3	9.5	24.1	17.0	6.3	15.4	17.2	30.4	19.2	38.9	11.0	25.2	14.2	27.6
No Rank Reported	4.2	3.2	2.0	7.1	0.0	3.8	6.8	0.0	0.0	0.0	0.2	4.5	8.4	4.6	6.8	3.2	0.0	0.0	2.8	2.2	7.2	1.5

*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.

field of classical languages and literature were full professors.

Among the most recent graduates (1975-1976), approximately three out of five men and women reported the rank of assistant professor (65.4 ± 2.4 and 60.1 ± 2.7 percent, respectively). Roughly equivalent percentages of the men and women held assistant professorships in most of the Ph.D. fields for this cohort.

MEDIAN ANNUAL SALARY BY SEX, AGE, AND FIELD OF EMPLOYMENT

Full-time employed Ph.D.'s in the humanities earned a median annual salary of $21,100 (±$100) in 1977 (Table 2.8). Ph.D.'s working in speech reported a median salary of $22,000 (±$500), whereas those employed in classical languages and literature earned a median salary of $19,300 (±$500). In general, median salaries varied little among the various employment fields for Ph.D.'s in the humanities.

For all fields combined, men had a median salary of $22,100 (±$200) compared with $18,300 (±$100) for women. Figure 2.1 shows that men also reported higher salaries in each employment field. In the selected social sciences, for example, men earned a median salary of $24,000 (±$400) compared with $19,600 (±$400) for women. In English and American literature men had a median salary of $21,200 (±$400) while women reported an annual salary of $18,000 (±$300).

Examination of the data in Table 2.8 shows that salaries increased with age, with Ph.D.'s 55 and over earning approximately $27,000 pear year. Ph.D.'s under 30 reported median salaries of $15,100 (±$200). Men and women Ph.D.'s under 30 earned virtually the same salary, whereas in the 55-59 age group, men earned $28,500 (±$400) and women reported $20,900 (±$500).

TABLE 2.8 Median Annual Salaries of Full-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences by Sex, Age, and Field of Employment, 1977

		Field of Employment											
Sex and Age in 1977	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas- sics	Modrn Lang	SocSc*	Other	No Report
Male and Female, Total+	21,100	21,400	19,900	20,800	22,000	20,100	19,900	20,100	19,300	20,000	23,300	22,800	22,200
Under 30	15,100							14,900		15,500		13,400	
30-34	17,000	16,800	16,400	17,300	17,600	16,700	16,300	16,500	16,500	16,200	18,100	16,900	
35-39	18,900	19,400	17,400	19,000	19,400	18,500	18,200	18,200	18,400	17,900	21,400	19,300	
40-44	21,300	21,200	20,500	19,300	21,100	20,800	20,600	20,800	21,000	19,900	24,100	23,500	
45-49	23,400	23,300	23,300	23,500	24,600	24,300	20,600	21,500	24,100	22,200	26,700	25,200	22,700
50-54	26,000	26,800	23,300	24,200	24,900	24,500	22,400	24,900		23,600	30,900	27,500	28,700
55-59	27,300	28,100	23,500	26,200	25,600	26,000	26,800	26,700		26,000	29,800	29,700	
60-64	27,300	26,800	26,700	25,300			25,100	27,800		26,100	31,000	27,500	
Over 64	27,800	27,500					26,500	28,600		26,600	34,400	24,600	
Male, Total+	22,100	21,700	21,300	21,500	22,600	20,300	20,600	21,200	20,000	21,100	24,000	24,100	23,500
Under 30	15,100												
30-34	17,100	17,000	16,800	17,500		16,600	16,400	16,400	16,700	16,500	18,400	17,100	
35-39	19,200	19,500	17,700	19,200	19,400	18,800	18,600	18,400	18,900	18,100	21,900	19,900	
40-44	21,800	21,400	20,500	19,600	21,200	21,100	20,700	21,900		19,900	24,100	24,200	
45-49	24,300	23,600	24,100	24,000	24,900	24,500	22,300	22,600		22,600	27,800	25,800	
50-54	27,400	27,800		24,500	25,800	24,700	23,700	26,900		25,800	31,700	28,500	
55-59	28,500	28,300		26,300	25,600	26,000	28,100	28,300		28,100	30,200	30,600	
60-64	28,800	27,500		25,500			22,100	29,100		27,300	31,300	29,800	
Over 64	29,300	27,500						29,700		29,700	34,800	26,200	
Female, Total+	18,300	19,200	17,800	18,200	19,500	18,700	18,000	18,000	17,200	18,100	19,600	18,100	19,500
Under 30	15,200												
30-34	16,300	15,800				17,400		16,600		15,700	17,300	16,200	
35-39	17,500	18,800	16,800			17,500	15,900	17,300		17,300	19,600	16,400	
40-44	18,900	19,100				20,000	20,500	17,700		19,900	22,000	18,400	
45-49	19,800	21,700					18,000	18,900		20,000	21,900	19,500	
50-54	20,100						18,000	20,300		19,400	23,900	21,900	
55-59	20,900						23,900	18,100		21,100		17,600	
60-64	22,100									21,500		19,000	
Over 64	23,500												

NOTE: Median salaries were computed only for Ph.D.'s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians have not been calculated for cells with less than 20 cases reporting salary.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.
+Includes those not reporting age.

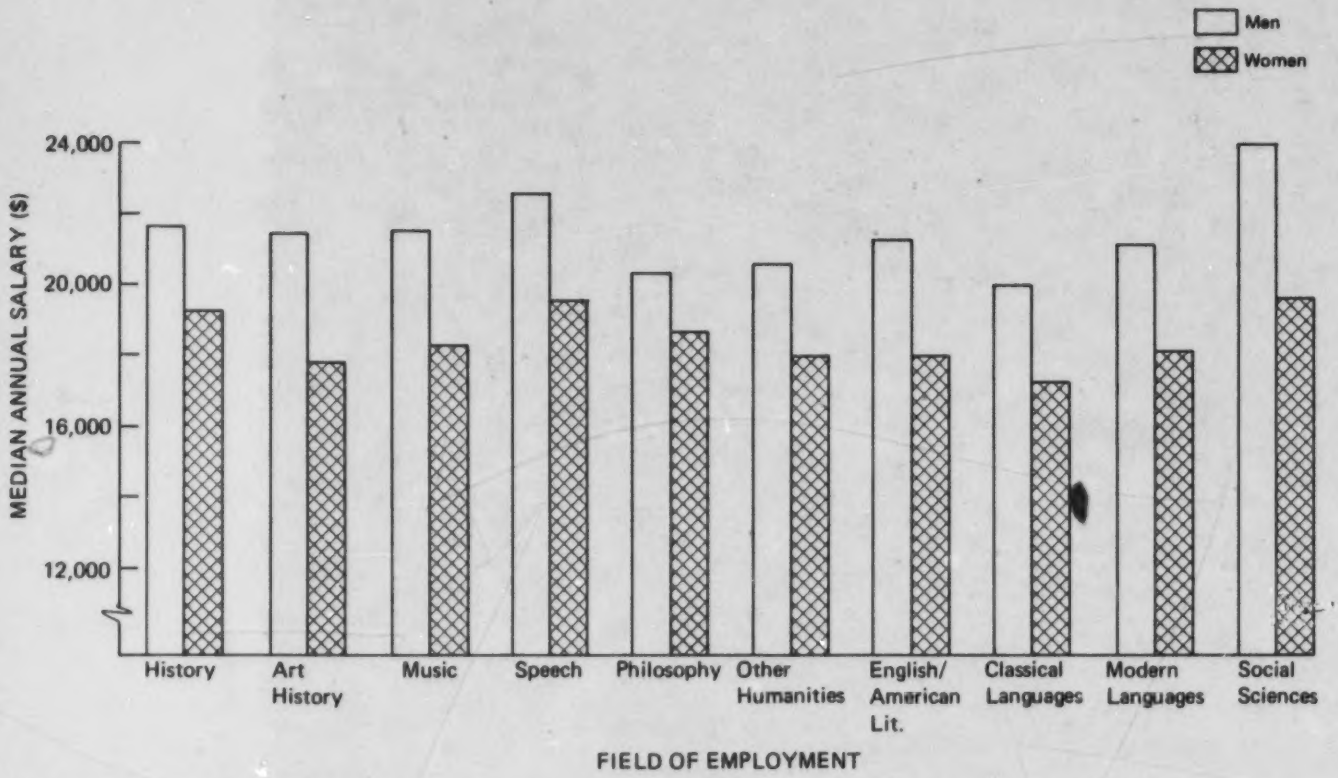


FIGURE 2.1 Median Annual Salaries of Full-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences by Field of Employment and Sex, 1977*

*For relationships between cohorts and salaries refer to Table 2.8.

MEDIAN ANNUAL SALARY BY SEX, TYPE OF EMPLOYER, AND FIELD OF EMPLOYMENT

The median annual salary in 1977 for educational institutions, which employed 88.0 percent of the Ph.D.'s in the humanities, was $21,100 (±$200) (Table 2.9). Salary comparisons among types of educational institutions show that Ph.D.'s in two-year colleges whose 1977 employment field was modern languages earned $24,000 (±$1,000), while those in four-year colleges or universities reported $19,900 (±$100).

The federal government, with an estimated median salary of $28,900 (±$1,200), was the highest paying employer in 1977. It should be noted, however, that most of the sample individuals working for the federal government were employed in the social sciences or fields outside the humanities. Little variation in median salaries was observed among the other employers.

Comparison between the sexes show higher median salaries for men in all employer categories except two-year colleges, where the apparent disparity is not statistically significant. For Ph.D.'s employed in four-year colleges or universities, men earned $22,200 (±$200) as opposed to $18,500 (±$100) for women. Salaries were lower for women in nearly all employment fields. In English/American literature, men earned $21,500 (±$500) while women had an annual salary of $18,000 (±$300). The differences between salaries for men and women philosophers were not statistically significant.

The low medians reported for women doctorates in business and industry ($13,100 ± $900) and state or local government ($14,200 ± $1,200) should be interpreted with caution due to the small number of Ph.D.'s involved. Most of the women in these employment sectors were working in the social sciences or nonhumanities fields.

TABLE 2.9 Median Annual Salaries of Full-Time Employed Ph.D.'s in the Humanities and Selected Social Sciences by Sex, Type of Employer, and Field of Employment, 1977

		Field of Employment											
Sex and Type of Employer	All Fields	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas-sics	Modrn Lang	SocSc*	Other	No Report
Male and Female, Total	21,100	21,400	19,900	20,800	22,000	20,100	19,900	20,100	19,300	20,000	23,300	22,800	22,200
Business/Industry	20,000											19,200	
Educational Institution	21,100	21,500	19,900	20,900	22,100	20,000	20,100	20,100	19,300	20,000	22,700	23,900	22,200
4-Year College/Univ	21,200	21,800	19,900	21,100	22,000	20,000	20,200	20,300	19,600	19,900	22,700	24,100	22,300
2-Year College/Univ	20,600	20,200		18,500		20,600	19,400	18,400		24,000		24,300	
Elem/Sec School	18,400	20,400						14,800		18,400		18,600	
Private Foundation													
Museum or Historial Society	18,100		18,800										
Research Library or Archives	20,400												
Federal Government	28,900										32,300	29,000	
State/Local Government	18,100										24,500	17,600	
Other/No Report	20,000										24,500	18,200	
Male, Total	22,100	21,700	21,300	21,500	22,600	20,300	20,600	21,200	20,000	21,100	24,000	24,100	23,500
Business/Industry	21,100											20,700	
Educational Institution	22,100	21,800	21,300	21,700	22,700	20,200	21,000	21,200	20,000	21,100	23,200	24,600	23,100
4-Year College/Univ	22,200	22,100	21,300	21,900	22,500	20,200	21,200	21,500	20,300	20,900	23,100	24,800	23,400
2-Year College/Univ	21,100	20,300						18,800		25,100		25,000	
Elem/Sec School	19,000	20,400										19,100	
Private Foundation													
Museum or Historical Society	18,100												
Research Library or Archives	21,000												
Federal Government	29,300										33,600	29,100	
State/Local Government	18,900											18,400	
Other/No Report	21,000											20,000	
Female, Total	18,300	19,200	17,800	18,200	19,500	18,700	18,000	18,000	17,200	18,100	19,600	18,100	19,500
Business/Industry	13,100											13,600	
Educational Institution	18,500	19,400	17,700	18,300	19,600	18,700	18,100	18,000	17,200	18,200	19,800	20,300	19,900
4-Year College/Univ	18,500	19,300	17,600	18,500	19,300	18,600	18,200	18,000	17,400	18,000	19,700	20,300	19,600
2-Year College/Univ	19,300							18,000					
Elem/Sec School	14,900											14,900	
Private Foundation													
Museum or Historical Society													
Research Library or Archives													
Federal Government	19,900												
State/Local Government	14,200												
Other/No Report	15,700											10,600	

NOTE: Median salaries were computed only for Ph.D.'s employed full-time, excluding those in the U.S. Military. Academic salaries were multiplied by 11/9 to adjust for a full-year scale. Medians have not been calculated for cells with less than 20 cases reporting salary.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.

GEOGRAPHIC DIFFERENCES IN EMPLOYMENT STATUS

U.S. Total

The labor force of doctorate recipients in the humanities was slightly under 73,100 in 1977. Table 2.10 shows that, nationwide, 91.1 ± 0.3 percent of these Ph.D.'s in the labor force were employed full-time, while 2.9 ± 0.2 percent were unemployed and seeking employment. The remaining 6.0 ± 0.2 percent of the labor force held part-time jobs or postdoctoral appointments.

Regional Variations

On a regional basis, there were similarities in the percentages of full-time employed Ph.D.'s in the humanities. The regions with the highest percentages working full-time were the East South Central states (93.8 ± 1.2 percent) and the West North Central states (93.3 ± 1.0 percent).

State Variations

Because of the small number of Ph.D.'s in many of the states, all employment statistics, and particularly the unemployment rates, should be interpreted in conjunction with the sampling errors. Sampling errors for employment data are presented in Table 2.10. The reader can construct confidence intervals at the levels deemed appropriate. In the states of New Hampshire, Vermont, North Dakota, South Dakota, Delaware, West Virginia, Mississippi, Nevada, Wyoming, and the U.S. possessions, no sample members reported being unemployed and seeking employment.

The estimated number of humanities Ph.D.'s residing in each state is shown in Figure 2.2.

TABLE 2.10 Employment. Unemployment and Labor Force of Ph.D.'s in the Humanities and Selected Social Sciences* by States, 1977

(Standard errors in parentheses)

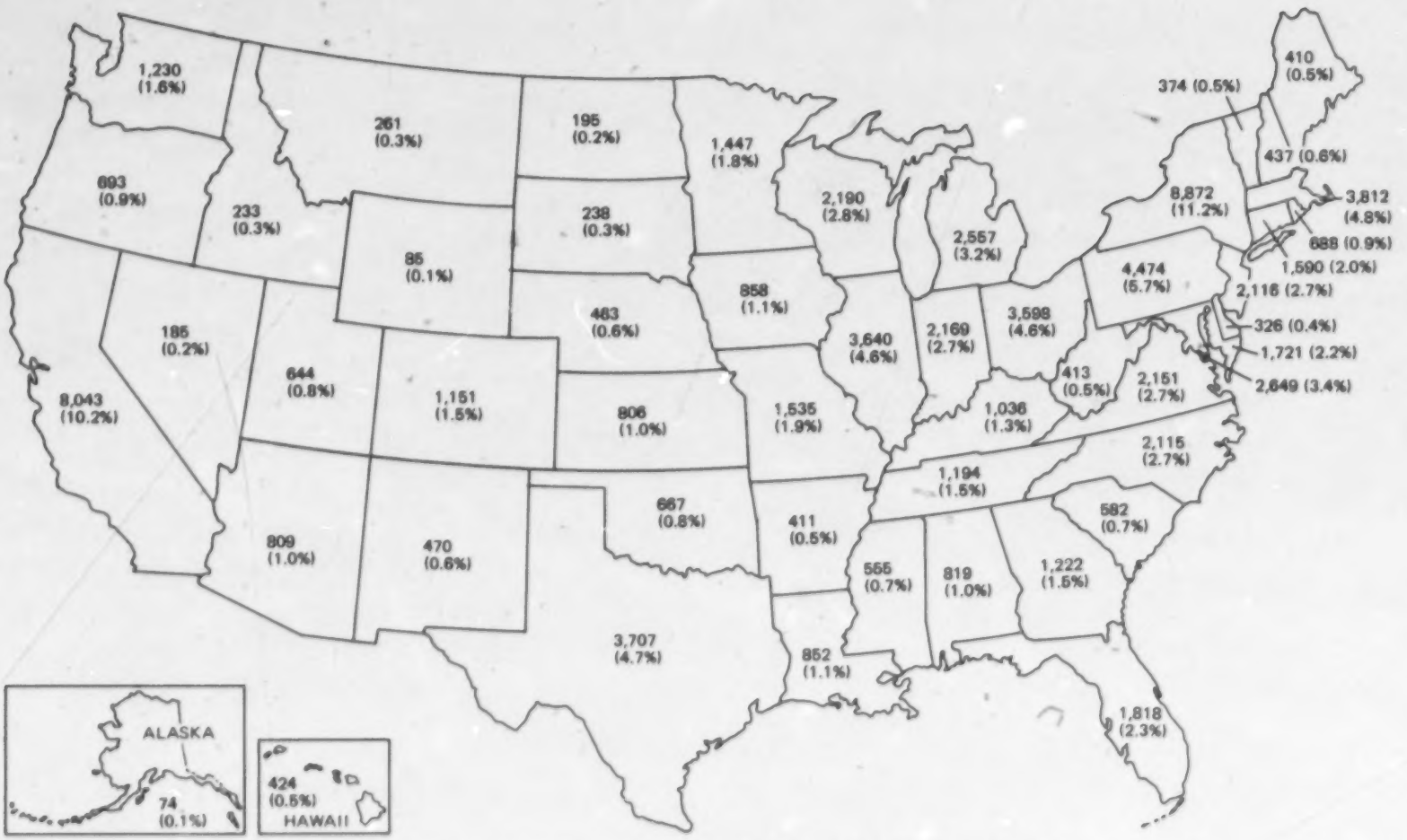
1977 Employment Location	Total Ph.D. Labor Force**	Full-Time Employed	Unemployed Seeking Employment+	Other Labor Force#
All Locations	73,074	91.1% (0.3)	2.9% (0.2)	6.0%
New England	6,792	89.7 (1.1)	2.9 (0.6)	7.3
Connecticut	1,481	89.7 (2.2)	4.8 (1.7)	5.5
Maine	378	95.8 (1.9)	1.6 (1.4)	2.6
Massachusetts	3,580	87.6 (1.6)	2.5 (0.7)	9.9
New Hampshire	408	93.4 (3.8)	-	6.6
Rhode Island	633	91.9 (2.2)	5.1 (2.8)	3.0
Vermont	312	97.4 (2.7)	-	2.6
Middle Atlantic	14,250	89.6 (0.7)	3.8 (0.4)	6.7
New Jersey	1,981	91.4 (1.7)	2.8 (0.9)	5.8
New York	8,202	87.6 (1.0)	4.7 (0.7)	7.8
Pennsylvania	4,067	92.7 (1.1)	2.4 (0.6)	4.9
East North Central	13,227	92.4 (0.7)	2.5 (0.4)	5.1
Illinois	3,461	91.9 (1.3)	3.2 (0.9)	4.9
Indiana	2,055	93.5 (1.6)	2.4 (0.9)	4.1
Michigan	2,394	95.0 (1.4)	0.5 (0.3)	4.6
Ohio	3,252	90.0 (1.5)	3.1 (0.8)	6.9
Wisconsin	2,065	92.8 (1.6)	2.8 (1.2)	4.4
West North Central	5,157	93.3 (1.0)	1.9 (0.5)	4.8
Iowa	783	93.6 (2.5)	1.8 (1.4)	4.6
Kansas	718	96.7 (1.8)	1.3 (0.8)	2.1
Minnesota	1,324	93.1 (2.0)	2.0 (1.2)	4.9
Missouri	1,468	91.1 (2.0)	2.4 (1.1)	6.5
North Dakota	195	100.0	-	
Nebraska	462	92.6 (3.4)	2.6 (2.4)	4.8
South Dakota	207	92.3 (5.5)	-	7.7
South Atlantic	11,898	91.4 (0.8)	2.2 (0.4)	6.5
Delaware	311	97.7 (2.2)	-	2.3
District of Columbia	2,558	88.8 (1.9)	1.7 (0.8)	9.5
Florida	1,549	91.8 (2.0)	1.9 (0.9)	6.3
Georgia	1,102	98.4 (0.8)	0.2 (0.2)	1.5
Maryland	1,489	84.1 (2.9)	4.8 (1.7)	11.1
North Carolina	1,975	92.9 (1.8)	2.1 (1.0)	5.1
South Carolina	546	86.3 (4.5)	8.1 (4.1)	5.7
Virginia	1,959	94.3 (1.4)	1.3 (0.7)	4.4
West Virginia	409	93.9 (3.4)	-	6.1
East South Central	3,363	93.8 (1.2)	1.8 (0.6)	4.4
Alabama	756	90.7 (3.1)	4.4 (2.1)	4.9
Kentucky	986	93.0 (2.2)	2.5 (1.4)	4.5
Mississippi	517	96.1 (2.7)	-	3.9
Tennessee	1,104	95.5 (1.8)	0.2 (0.1)	4.3
West South Central	5,289	92.2 (1.0)	3.8 (0.7)	4.0
Arkansas	407	94.6 (3.3)	5.4 (3.3)	
Louisiana	795	90.8 (3.3)	2.3 (1.3)	6.9
Oklahoma	627	89.5 (3.1)	2.4 (1.5)	8.1
Texas	3,460	92.7 (1.2)	4.2 (0.9)	3.1
Mountain	3,411	91.7 (1.3)	2.9 (0.8)	5.4
Arizona	679	94.7 (2.0)	3.5 (1.8)	1.8
Colorado	1,038	90.8 (2.7)	3.5 (1.9)	5.8
Idaho	231	93.1 (4.7)	1.3 (0.9)	5.6
Montana	242	91.7 (5.4)	4.5 (4.4)	3.7
New Mexico	381	89.5 (4.2)	4.7 (2.3)	5.8
Nevada	178	94.9 (4.8)	-	5.1
Utah	587	89.6 (3.3)	1.2 (1.0)	9.2
Wyoming	75	92.0 (5.6)	-	8.0
Pacific	9,532	89.0 (0.9)	3.8 (0.6)	7.3
Alaska	74	75.7 (14.6)	12.2 (10.8)	12.2
California	7,296	88.1 (1.1)	3.7 (0.7)	8.2
Hawaii	390	95.6 (2.1)	2.3 (1.9)	2.1
Oregon	637	89.0 (3.3)	6.6 (2.8)	4.4
Washington	1,135	92.7 (2.4)	2.7 (1.6)	4.6
U.S. Possessions	155	100.0	-	

*Social Sciences for the humanities chapter include the following selected fields: Archeology, Linguistics, Area Studies, Political Science, Public Administration, and International Relations.

**Includes full-time and part-time employed, postdoctoral appointees, and those unemployed and seeking employment.

+Dash (-) indicates none in sample reporting unemployed/seeking employment status.

#Includes part-time employed plus postdoctoral appointees.



Note: Sampling errors associated with the percentage estimates for each state may be approximated by using the procedure discussed in Appendix D.

FIGURE 2.2 Geographic Distribution of Humanities Doctorates, 1977 (Estimated Population of 1934-76 Ph.D.'s in the Humanities and Selected Social Sciences in the U.S. = 79,009, excluding 165 in U.S. possessions).

EMPLOYMENT STATUS BY SEX AND FIELD OF DOCTORATE

Table 2.11 shows that, for the total labor force of Ph.D.'s in the humanities, the fields of speech and selected social sciences had the lowest rates of unemployment--0.9 ± 0.3 and 1.3 ± 0.3 percent, respectively. Philosophers reported a relatively high percentage of unemployment--4.6 ± 0.9 percent.

TABLE 2.11 Employment Status, Including Unemployment Rates, of Ph.D.'s in the Humanities and Selected Social Sciences by Sex and Field of Doctorate, 1977

		Field of Doctorate									
Sex and 1977 Employment Status	Total	Hist	Art Hist	Music	Sp'ch	Phil	Other Humn	Eng/ Amer Lit	Clas- sical Lang & Lit	Mod- ern Lang & Lit	SocSc
Total, Male and Female											
Number in Labor Force+	73,074	16,100	1,369	3,544	3,538	5,368	1,692	16,793	1,537	10,198	12,935
Employed Full-Time	91.1	92.1	86.7	90.3	95.5	89.1	90.4	90.3	89.1	88.3	93.6
Unemployed, Seeking Employment	2.9	2.9	3.9	2.3	0.9	4.6	3.4	3.3	3.0	4.3	1.3
Other Labor Force	6.0	5.0	9.3	7.4	3.6	6.3	6.2	6.4	7.9	7.4	5.1
Males											
Number in Labor Force+	57,815	13,952	807	3,007	2,963	4,664	1,193	12,087	1,166	6,750	11,226
Employed Full-Time	94.3	94.8	90.7	93.1	98.0	91.1	92.9	94.2	94.3	93.7	95.1
Unemployed, Seeking Employment	1.9	1.7	3.0	1.5	0.2	4.0	3.0	2.1	1.2	2.8	0.9
Other Labor Force	3.8	3.5	6.3	5.3	1.8	4.9	4.1	3.7	4.5	3.5	4.0
Females											
Number in Labor Force+	15,259	2,148	562	537	575	704	499	4,706	371	3,448	1,709
Employed Full-Time	78.9	74.9	81.0	74.3	82.6	76.1	84.4	80.3	73.0	77.6	83.3
Unemployed, Seeking Employment	6.8	10.4	5.3	6.5	4.2	8.7	4.4	6.2	8.6	7.2	4.2
Other Labor Force	14.2	14.7	13.7	19.2	13.2	15.2	11.2	13.5	18.3	15.2	12.6

+Labor force includes full-time employed, part-time employed, postdoctoral appointees, and those unemployed and seeking employment.
*Social sciences for the humanities chapter include the following selected fields: archeology, linguistics, area studies, political science, public administration, and international relations.

A comparison of employment status by sex shows women Ph.D.'s with an unemployment level of 6.8 ± 0.5 percent, three times the rate for men (1.9 ± 0.2 percent). Of the women in the labor force with Ph.D.'s in history, 10.3 ± 1.7 percent were unemployed and seeking work.

In 1977, 94.3 ± 0.3 percent of the men held full-time positions, compared with only 78.9 ± 0.7 percent of the women. In every field, the percentage of the labor force in less than full-time employment was higher for women than

for men. In music, 19.2 ± 2.8 percent of the women in the labor force were working part-time or held postdoctoral positions; in classics the proportion was similar--18.3 ± 3.4 percent.

APPENDIX A

1977 SURVEY OF DOCTORATE RECIPIENTS

QUESTIONNAIRE AND SPECIALTIES LIST

OMB No. 099-RO294

1977 SURVEY OF DOCTORATE RECIPIENTS

CONDUCTED BY THE NATIONAL RESEARCH COUNCIL WITH THE SUPPORT OF THE NATIONAL SCIENCE FOUNDATION, THE NATIONAL ENDOWMENT FOR THE HUMANITIES, AND THE NATIONAL INSTITUTES OF HEALTH

THE ACCOMPANYING LETTER requests your assistance in this biennial survey of Ph.D.'s in the humanities, sciences, and engineering.

PLEASE READ the instructions for each question carefully and answer by printing your reply or checking the appropriate box.

PLEASE CHECK the pre-printed information to be certain that it is correct and complete.

PLEASE RETURN the completed form in the enclosed envelope to the Commission on Human Resources, JH 638, National Research Council, 2101 Constitution Avenue, N.W., Washington, D.C. 20418.

NOTE: THIS INFORMATION IS SOLICITED UNDER THE AUTHORITY OF THE NATIONAL SCIENCE FOUNDATION ACT OF 1950, AS AMENDED. ALL INFORMATION YOU PROVIDE WILL BE TREATED AS CONFIDENTIAL AND USED FOR STATISTICAL PURPOSES ONLY. INFORMATION WILL BE RELEASED ONLY IN THE FORM OF STATISTICAL SUMMARIES OR IN A FORM WHICH DOES NOT IDENTIFY INFORMATION ABOUT ANY PARTICULAR PERSON. YOUR RESPONSE IS ENTIRELY VOLUNTARY AND YOUR FAILURE TO PROVIDE SOME OR ALL OF THE REQUESTED INFORMATION WILL IN NO WAY ADVERSELY AFFECT YOU.

_____

_____

_____

If your name and address are incorrect, please enter correct information above. Include ZIP CODE. (10)

If there is an alternate address through which you can always be reached, please provide it on the line below.

C/O Number Street City State ZIP Code (11)

1. Date of Birth Mo. Day Year (12-16)	2. State or Foreign Country of Birth (17-18)	3. Citizenship 0 ☐ U.S.A. 1 ☐ Non-U.S.A., Specify Country _____ (19) (20-21)	4. Sex 1 ☐ M 2 ☐ F (22)

5. What is your racial background?

0 ☐ American Indian or Alaskan Native
1 ☐ Asian or Pacific Islander
2 ☐ Black
3 ☐ White

(23)

5a. Is your ethnic heritage Hispanic?

0 ☐ Yes
1 ☐ No

(24)

6. List in the table below all collegiate and graduate degrees, excluding honorary degrees, that have been awarded to you. Please check the pre-printed information, including the number and name of the specialty from the list on page 4, to be certain that it is correct and complete.

Type of Degree	Granted Mo. Yr.	Major Field (Use Specialties List) Name Number	Institution Name	City (or Campus) & State
Bachelor's				
Master's				
Doctorate				
Other (Specify) _____				

7. What was your employment status as of February 6-12, 1977? (Check only one category.)

Employed full-time in field of Ph.D. ☐ 1
Employed full-time in field other than field of Ph.D. ☐ 2
Employed part-time ☐ 3
Were you seeking full-time employment?
1 ☐ Yes 2 ☐ No (66)
Postdoctoral appointment (fellowship, traineeship, research associateship, etc.) ☐ 4
Unemployed and seeking employment ☐ 5
Not employed and not seeking employment ☐ 6
Retired and not employed ☐ 7
Other, specify: _____ ☐ 8

(65)

7a. If you were employed full-time during February 6-12, 1977, in a field other than your field of Ph.D., what was the MOST important reason for taking the position?

Preferred position outside Ph.D. field ☐ 1
Promoted out of position in Ph.D. field ☐ 2
Better pay ☐ 3
Locational factors ☐ 4
Position in Ph.D. field not available ☐ 5
Other, specify: _____ ☐ 6

(67)

If you checked 5, 6 or 7, ANSWER ONLY 8a, 9a, 13, 14 and 17 of the following questions.

8. Which category below best describes the type of organization of your principal employment OR postdoctoral appointment during February 6-12, 1977? (Check only one category.)

- ☐ 1 Business or industry
- ☐ 2 Junior college, 2-year college, technical institute
- ☐ 3 Medical school
- ☐ 4 4-Year college
- ☐ 5 University, other than medical school
- ☐ 6 Elementary or secondary school system
- ☐ 7 Private foundation
- ☐ 8 Museum or historical society
- ☐ 9 Research library or archives
- ☐ 10 Hospital or clinic
- ☐ 11 U.S. military service, active duty, or Commissioned Corps, e.g., USPHS, NOAA
- ☐ 12 U.S. government, civilian employee
- ☐ 13 State government
- Local or other government, specify:
  - ☐ 14 _____
- ☐ 15 Non-profit organization, other than those listed above
- ☐ 16 Other, specify: _____

(68-69)

8a. Which of the above categories best describes the type of organization related to your first position following the receipt of your doctorate? (List only one category)

_____ _____

Type of Organization (70-71)

9. What percent of time did you devote to each of the following activities during the week of February 6-12, 1977? (Total should equal 100%) **What were your primary (A) and secondary (B) work activities?** (Check only one in each column.)

	%		A	B
Management or administration of				
Research and development	_____	(10)	☐ 1	☐
Other than research and development	_____	(12)	☐ 2	☐
Both	_____	(14)	☐ 3	☐
Basic research	_____	(16)	☐ 4	☐
Applied research	_____	(18)	☐ 5	☐
Development of equipment, products, systems, data	_____	(20)	☐ 6	☐
Development of humanities resource materials	_____	(22)	☐ 7	☐
Design	_____	(24)	☐ 8	☐
Teaching	_____	(26)	☐ 9	☐
Writing, editing	_____	(28)	☐ 10	☐
Curatorial	_____	(30)	☐ 11	☐
Production	_____	(32)	☐ 12	☐
Consulting, specify: _____	_____	(34)	☐ 13	☐
Professional services to individuals	_____	(36)	☐ 14	☐
Quality control, inspection, testing	_____	(38)	☐ 15	☐
Sales, marketing, purchasing, estimating	_____	(40)	☐ 16	☐
Other, specify: _____	_____	(42)	☐ 17	☐
	Total = 100%		(44-47)	

9a. Which of the above categories best describes the primary work activity related to your first position following the receipt of your doctorate?

_____

Primary Work Activity Number (48-49)

10. From the Degree and Employment Specialties List on page 4 select and enter both the number and title of the employment specialty most closely related to your principal employment or postdoctoral appointment during the week of February 6-12, 1977. Write in your specialty if it is not on the list.

_____

Number Title of Employment Specialty (50-52)

11. Please give the name of your principal employer (organization, company, etc. or, if self employed, write "self"), and actual place of employment as of the week of February 6-12, 1977.

_____

Name of Employer (53-58)

_____

Number Street

_____

City State ZIP Code (59-63)

12. What was the basic annual salary* associated with your principal professional employment during the week of February 6-12, 1977? If you were on a postdoctoral appointment (e.g., fellowship, traineeship, research associateship), what was your annual stipend plus allowances?

$ _____ per year (64-66)

*NOTE: Basic annual salary is your annual salary before deductions for income tax, social security, retirement, etc., but does not include bonuses, overtime, summer teaching, or other payment for professional work.

IF ACADEMICALLY EMPLOYED:

a. Check whether salary was for ☐ 9-10 months or ☐ 11-12 months. (67)

b. Did you hold a tenured position during February 6-12, 1977? 0 ☐ Yes 1 ☐ No (68)
If Yes, what year was tenure granted? _____ (69-70)

c. What was the rank of your position? (Check only one.)

- 1 ☐ Professor
- 2 ☐ Associate Professor
- 3 ☐ Assistant professor
- 4 ☐ Instructor
- 5 ☐ Lecturer
- 6 ☐ Other, specify: _____

(71)

d. What, if any, administrative position did you hold?

- 1 ☐ Dean
- 2 ☐ Department Chairman
- 3 ☐ President or Chancellor
- 4 ☐ Vice-President or Vice-Chancellor
- 5 ☐ Other, specify: _____
- 6 ☐ Does not apply

(72)

13. **How many full-time equivalent years of professional work experience, including teaching, have you had?** _____ **Year(s)**
(73-74)

14. **Following completion of your doctorate have you ever held a fellowship, traineeship, or research associateship?** 0 ☐ Yes 1 ☐ No
(75)

15. **Listed below are selected topics of national interest. If you devoted a proportion of your professional time which you considered significant to any of these problem areas during the week of February 6-12, 1977, please check the box for the one on which you spent the MOST time.**

1 ☐ Health
2 ☐ Defense
3 ☐ Environmental protection, pollution control
4 ☐ Education
5 ☐ Space
6 ☐ Crime prevention and control
7 ☐ Energy and fuel
8 ☐ Food and other agricultural products
9 ☐ Natural resources,other than fuel or food
10 ☐ Community development and services
11 ☐ Housing (planning, design, construction)
12 ☐ Transportation, communications
13 ☐ Cultural life
14 ☐ Other area, specify: _____
15 ☐ Does not apply
(10-11)

16. **Was any of your work in the week of February 6-12, 1977 supported or sponsored by U.S. Government funds?**

0 ☐ Yes 1 ☐ No 2 ☐ Don't know (12)

If Yes, which of the following federal agencies or departments were supporting the work? (Check all that apply.)

13 ☐ Agency for International Development
14 ☐ Energy Research & Development Administration
15 ☐ Environmental Protection Agency
16 ☐ National Aeronautics & Space Administration
17 ☐ National Endowment for the Arts
18 ☐ National Endowment for the Humanities
19 ☐ National Science Foundation
20 ☐ Nuclear Regulatory Commission
21 ☐ Smithsonian Institution
22 ☐ Department of Agriculture
23 ☐ Department of Commerce
24 ☐ Department of Defense

Department of Health, Education, and Welfare
25 ☐ National Institutes of Health
26 ☐ Alcohol, Drug Abuse & Mental Health Administration
27 ☐ National Institute of Education
28 ☐ Office of Education
29 ☐ Other, specify: _____
30 ☐ Department of Housing and Urban Development
31 ☐ Department of the Interior
32 ☐ Department of Justice
33 ☐ Department of Labor
34 ☐ Department of State
35 ☐ Department of Transportation
36 ☐ Other agency or department, specify: _____
37 ☐ Don't know source agency

17. **If you received your doctoral degree in science or engineering or are employed as a scientist or engineer, please check all that apply below:**

☐ (a) Changed positions during the period 1973 to 1976.
☐ (b) Received doctoral degree in 1965 or later and employed sometime since receiving your doctoral degree in industry, government, or as non-faculty academic staff.
☐ (c) Held a postdoctoral appointment any year during 1970-1976 inclusive.
☐ (d) None of the above apply.
(38-41)

If you have checked a, b, or c, please give a brief career history starting with the position prior to your present position and continuing back in time for a maximum of four positions after receiving your doctoral degree (Include postdoctoral appointments).

Name and Location (City and State) of Employer	Position Title	Dates Held	Primary Work Activity*	Employment Specialty (Use Degree & Employment Specialties List)	Reason for Leaving Position
1.					
2.					
3.					
4.					

*Enter code (1-17) from the list given in item 9.

(a) Of the positions described above, as well as your present position, please check any in which your doctoral training was/is not being used.
☐ Position 1 ☐ Position 2 ☐ Position 3 ☐ Position 4 ☐ Present Position ☐ None

(74-79)

DEGREE AND EMPLOYMENT SPECIALTIES LIST

MATHEMATICAL SCIENCES

000 - Algebra
010 - Analysis & Functional Analysis
020 - Geometry
030 - Logic
040 - Number Theory
052 - Probability
055 - Math. Statistics (see also 544, 670, 725, 729)
060 - Topology
082 - Operations Research (see also 478)
085 - Applied Mathematics
089 - Combinatorics & Finite Mathematics
091 - Physical Mathematics
098 - Mathematics, General
099 - Mathematics, Other*

COMPUTER SCIENCES

071 - Theory
072 - Software Systems
073 - Hardware Systems
074 - Intelligent Systems
079 - Computer Sciences, Other

PHYSICS & ASTRONOMY

101 - Astronomy
102 - Astrophysics
110 - Atomic & Molecular Physics
120 - Electromagnetism
130 - Mechanics
132 - Acoustics
134 - Fluids
135 - Plasma Physics
136 - Optics
138 - Thermal Physics
140 - Elementary Particles
150 - Nuclear Structure
160 - Solid State
198 - Physics, General
199 - Physics, Other*

CHEMISTRY

200 - Analytical
210 - Inorganic
215 - Synthetic Inorganic & Organometallic
220 - Organic
225 - Synthetic Organic & Natural Products
230 - Nuclear
240 - Physical
245 - Quantum
250 - Theoretical
255 - Structural
260 - Agricultural & Food
265 - Thermodynamics & Material Properties
270 - Pharmaceutical
275 - Polymers
280 - Biochemistry (see also 540)
285 - Chemical Dynamics
298 - Chemistry, General
299 - Chemistry, Other*

EARTH, ENVIRONMENTAL AND MARINE SCIENCES

301 - Mineralogy, Petrology
305 - Geochemistry
310 - Stratigraphy, Sedimentation
320 - Paleontology
330 - Structural Geology
341 - Geophysics (Solid Earth)
350 - Geomorph. & Glacial Geology
361 - Applied Geol., Geol. Engr. & Econ. Geol.
365 - Fuel Tech. & Petrol. Engr. (see also 479)
360 - Hydrology & Water Resources
370 - Oceanography
397 - Marine Sciences, Other*
381 - Atmospheric Physics & Chemistry
382 - Atmospheric Dynamics
383 - Atmospheric Sciences, Other*
388 - Environmental Sciences, General (see also 480, 528)
389 - Environmental Sciences, Other*
398 - Earth Sciences, General
399 - Earth Sciences, Other*

ENGINEERING

400 - Aeronautical & Astronautical
410 - Agricultural
415 - Biomedical
420 - Civil
430 - Chemical
435 - Ceramic
440 - Electrical
445 - Electronics
450 - Industrial & Manufacturing
455 - Nuclear
460 - Engineering Mechanics
465 - Engineering Physics
470 - Mechanical
475 - Metallurgy & Phys. Met. Engr.
476 - Systems Design & Systems Science (see also 072, 073, 074)
478 - Operations Research (see also 082)
479 - Fuel Technology & Petrol. Engr.
480 - Sanitary & Environmental
486 - Mining
497 - Materials Science Engr.
498 - Engineering, General
499 - Engineering, Other*

AGRICULTURAL SCIENCES

500 - Agronomy
501 - Agricultural Economics
502 - Animal Husbandry
504 - Fish & Wildlife
505 - Forestry
506 - Horticulture
507 - Soils & Soil Science
510 - Animal Science & Animal Nutrition
511 - Phytopathology
517 - Food Science & Technology (see also 573)
518 - Agriculture, General
519 - Agriculture, Other*

MEDICAL SCIENCES

520 - Medicine & Surgery
522 - Public Health & Epidemiology
523 - Veterinary Medicine
524 - Hospital Administration
526 - Nursing
527 - Parasitology
528 - Environmental Health
534 - Pathology
536 - Pharmacology
537 - Pharmacy
538 - Medical Sciences, General
539 - Medical Sciences, Other*

BIOLOGICAL SCIENCES

540 - Biochemistry (see also 280)
542 - Biophysics
543 - Biomathematics
544 - Biometrics, Biostatistics (see also 055, 670, 725, 729)
545 - Anatomy
546 - Cytology
547 - Embryology
548 - Immunology
550 - Botany
560 - Ecology
562 - Hydrobiology
564 - Microbiology & Bacteriology
566 - Physiology, Animal
567 - Physiology, Plant
569 - Zoology
570 - Genetics
571 - Entomology
572 - Molecular Biology
573 - Food Science & Technology (see also 517)
574 - Behavior/Ethology
576 - Nutrition & Dietetics
578 - Biological Sciences, General
579 - Biological Sciences, Other*

PSYCHOLOGY

600 - Clinical
610 - Counseling & Guidance
620 - Developmental & Gerontological
630 - Education
635 - School Psychology
641 - Experimental
642 - Comparative
643 - Physiological
650 - Industrial & Personnel
660 - Personality
670 - Psychometrics (see also 055, 544, 725, 729)
680 - Social
698 - Psychology, General
699 - Psychology, Other*

SOCIAL SCIENCES

700 - Anthropology
703 - Archeology
708 - Communications*
709 - Linguistics
710 - Sociology
720 - Economics (see also 501)
725 - Econometrics (see also 055, 544, 670, 729)
729 - Social Statistics (see also 055, 544, 670, 725)
740 - Geography
745 - Area Studies*
751 - Political Science
752 - Public Administration
755 - International Relations
770 - Urban & Regional Planning
775 - History & Philosophy of Science
798 - Social Sciences, General
799 - Social Sciences, Other*

HUMANITIES

802 - History & Criticism of Art
804 - History, American
805 - History, European
806 - History, Other*
808 - American Studies
830 - Music
831 - Speech as a Dramatic Art (see also 885)
833 - Religion (see also 881)
834 - Philosophy
836 - Comparative Literature
878 - Humanities, General
879 - Humanities, Other*
891 - Library & Archival Sciences

LANGUAGES & LITERATURE

811 - American
812 - English
821 - German
822 - Russian
823 - French
824 - Spanish & Portuguese
826 - Italian
827 - Classical*
829 - Other Languages*

EDUCATION & OTHER PROFESSIONAL FIELDS

938 - Education
801 - Art, Applied
881 - Theology (see also 833)
882 - Business Administration
883 - Home Economics
884 - Journalism
885 - Speech & Hearing Sciences (see also 831)
886 - Law, Jurisprudence
887 - Social Work
897 - Professional Field, Other*

899 - OTHER FIELDS*

*Identify the specific field in the space on the questionnaire.

APPENDIX B

SAMPLING FRAME

In view of the longitudinal nature of the Survey of Doctorate Recipients, some readers may want to compare data in this report with information provided in previous survey publications. The reader should be aware of revisions in the sampling frame that affect the comparability of the 1977 data with the 1973 and 1975 estimates reported in previous publications.

Table B.1 summarizes these changes and provides information on the 1975 sampling frame, the adjustments made after the 1975 survey, and the 1977 sampling frame. The revisions to the sampling frame are as follows:

- Foreign Citizen Deletions* (See item 1 of Table B.1). This group consists of individuals who earned Ph.D.'s at U.S. institutions and indicated in NRC's Survey of Earned Doctorates that they were foreign citizens and planned to leave the United States after receiving their degrees (N = 13,573). These Ph.D.'s were presumed to be outside the U.S. labor force and therefore were deleted from the population and sampling frame.

- Cohort Deletions (See item 2 of Table B.1). Individuals who earned their doctorates from 1930 to 1933 in fields other than humanities were deleted from the 1977 sampling frame (N = 6,334).

- Cohort Additions (See item 3 of Table B.1). Individuals who earned their Ph.D.'s in fiscal years 1975 or 1976** in science or engineering were added to the roster (N = 35,671). Those 1975-1976 science and engineering Ph.D.'s who were foreign citizens and planned to leave the United States following receipt of their doctorates (2,621 out of 38,292 Ph.D.'s) were not added to the sampling frame.

- Redefinition of Segment 2 (See item 4 of Table B.1). The 1973 and 1975 surveys included a group of individuals with U.S. doctorates in education,

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* Those deleted were individuals who earned U.S. doctorates and received their Ph.D.'s since 1958, the first year for which data on citizenship and post-doctoral plans were collected from the Survey of Earned Doctorates.

** July 1, 1974 through June 30, 1976.

TABLE B.1 Sampling Frames for the 1975 and 1977 Surveys of Doctorate Recipients

Additions and Deletions to the 1975 Sampling Frame	All Segments	Doctorates from U.S. Institutions		Foreign Doctorates
		Segment 1*	Segment 2*	Segment 3*
1975 Sampling frame, total**	314,002	291,397	10,036	12,569
1. Delete 1958-1974 U.S. Ph.D.'s who were foreign citizens at the time of doctorate and planned to leave the U.S.	13,573(-)	13,542(-)	31(-)	-
2. Delete 1930-1933 Ph.D.'s in fields other than humanities	6,334(-)	5,856(-)	62(-)	416(-)
3. Add 1975-1976 U.S. doctorates in science and engineering+	35,671(+)	35,671(+)	-	-
4. Delete humanities Ph.D.'s who were employed in science or engineering from Segment 2	1,216(-)	-	1,216(-)	-
5. Add Doctorate Records File additions of 1934-1974 U.S. science and engineering Ph.D.'s	244(+)	244(+)	-	-
6. Delete individuals from Segments 2 and 3 who were identified as scientists or engineers prior to the receipt of their doctorates	495(-)	-	434(-)	61(-)
7. Other deletions/additions	52(+)	31(+)	4(-)	25(+)
1977 Sampling frame, scientists/engineers	328,351	307,945	8,289	12,117
8. Add 1930-1976 doctorates in humanities to Segment 1#	74,032(+)	74,032(+)	-	-
1977 Sampling frame, total	402,383	381,977	8,289	12,117

* See definition of Segments 1, 2, and 3 provided on page 2 of this report.

** These figures are referenced by Table B-1 on page 38 of the 1975 Profile report. See "Doctoral Roster Total" by "Category of Ph.D."

\+ Excludes 2,621 individuals who were foreign citizens at the time of receiving the doctorate and who planned to leave the United States following receipt of their degrees.

\# Excludes 1,283 individuals who were foreign citizens at the time of receiving the doctorate and planned to leave the United States following receipt of their degrees.

professional fields, or humanities who had indicated they were employed in science or engineering in the NSF's National Register of Scientific and Technical Personnel (1970). Individuals with humanities doctorates who were part of Segment 2 in the earlier surveys (N = 1,216) were reassigned to Segment 1 (U.S. doctorates in science, engineering, and humanities).

- Addition of Humanities Doctorates to Segment 1 (See item 5 of Table B.1). For the 1973 and 1975 surveys, only science and engineering Ph.D.'s were sampled from the NRC's Doctorate Records File. In 1977, Segment 1 (U.S. doctorates) was extended to include 1930-1976 humanities doctorates (N = 74,032).

APPENDIX C

RESPONSE RATES

TABLE C.1 Response Rates for the 1977 Survey of Doctorate Recipients in Science, Engineering, and the Humanities

	Sampling Frame* (N)	Sample (N)	Survey Sample+ (N)	Contacted# (N)	Survey Responses** (N)	Response Rates++ A (%)	Response Rates++ B (%)
Total	402,383	83,546	79,375	73,698	50,648	63.8	68.7
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	19,384	5,141	4,776	4,472	2,873	60.2	64.2
Physics/Astronomy	28,861	6,013	5,795	5,395	3,609	62.3	66.9
Chemistry	48,260	9,148	8,786	8,213	5,736	65.3	69.8
Earth Sciences	10,004	2,197	2,095	1,954	1,457	69.5	74.6
Engineering	47,590	7,667	7,506	6,779	4,429	59.0	65.3
Life Sciences (Agricultural, Medical and Biological)	82,060	20,104	19,359	18,062	12,707	65.6	70.4
Psychology	40,601	8,390	7,772	7,375	4,994	64.3	67.7
Social Sciences	50,622	9,282	8,653	7,927	5,187	59.9	65.4
History	19,257	2,784	2,620	2,459	1,809	69.0	73.6
Art History	1,722	643	616	575	430	69.8	74.8
Music	3,910	929	890	835	621	69.8	74.4
Speech	4,913	1,038	991	926	653	65.9	70.5
Philosophy	6,214	1,186	1,131	1,030	681	60.2	66.1
Other Humanities	2,202	1,059	1,003	932	705	70.3	75.6
English/American Literature	20,891	2,859	2,730	2,548	1,830	67.0	71.8
Classics	2,282	706	661	612	448	67.8	73.2
Modern Languages	12,641	3,810	3,625	3,294	2,278	62.8	69.2
Unknown	969	590	366	310	201	54.9	64.8
Year of Doctorate							
CY1930-49	42,954	10,025	8,384	7,630	5,444	64.9	71.3
CY1950-FY1961	85,740	16,864	15,800	14,904	10,455	66.2	70.1
FY1962-69	114,461	25,496	24,317	22,649	15,407	63.4	68.0
FY1970-74	113,743	21,726	21,470	19,788	13,210	61.5	66.8
FY1975-76	44,713	9,109	9,106	8,508	6,040	66.3	71.0
Unknown	772	326	298	219	92	30.9	42.0
Ph.D. Institution							
U.S.	390,266	78,464	74,574	68,708	48,108	64.5	69.0
Foreign	12,117	5,082	4,801	3,990	2,540	52.9	63.7
Sex							
Male	351,110	64,041	60,840	56,754	38,791	63.8	68.3
Female	51,273	19,505	18,535	16,944	11,857	64.0	70.0
Race/Ethnic Group							
Minority Group***	9,176	5,177	5,145	4,700	2,743	53.3	58.4
White/Unknown	393,207	78,369	74,230	68,998	47,905	64.5	69.4

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering. Hence, these figures exceed the population estimates shown in preceding tables of this report.

\+ The survey sample is the sample size minus persons known to be deceased or out-of-scope prior to the 1977 survey. The out-of-scope classification is assigned to an individual who indicated in a previous survey that he or she:
a) holds a doctorate in education or a professional field and works in a nonscience/nonengineering position, or
b) holds a Ph.D. degree from a foreign institution, is a foreign citizen, and resides in a foreign country.

\# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1977 survey and persons residing in foreign countries in 1977.

++ Response rate "A" is the number of 1977 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1977 survey responses divided by the number assumed to have been contacted

Individuals who earned doctorates in science, engineering, or the humanities were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

***Includes only those individuals whose ethnic group was known at the time the sample was selected. See Table 1.3 on page 12 and Table 2.3 on page 39 for the estimated percentages of minority group members in the population.

TABLE C.2 Response Rates for the 1975 Survey of Doctorate Recipients in Science and Engineering

	Sampling Frame* (N)	Sample (N)	Survey Sample+ (N)	Contacted# (N)	Survey Responses** (N)	Response Rates++ A (%)	Response Rates++ B (%)
Total	295,970	62,471	59,608	55,412	41,905	70.3	75.6
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	17,577	4,706	4,423	4,157	3,018	68.2	72.6
Physics/Astronomy	26,771	5,527	5,343	4,984	3,694	69.1	74.1
Chemistry	45,770	8,501	8,178	7,532	5,836	71.4	77.5
Earth Sciences	9,094	2,040	1,947	1,837	1,453	74.6	79.1
Engineering	42,543	6,840	6,709	6,162	4,635	69.1	75.2
Life Sciences (Agricultural, Medical and Biological)	73,817	18,243	17,599	16,436	12,822	72.9	78.0
Psychology	35,290	7,659	7,186	6,676	4,965	69.1	74.4
Social Sciences	44,118	8,351	7,802	7,257	5,203	66.7	71.7
Unknown	990	604	421	371	279	66.3	75.2
Year of Doctorate							
CY1932-49	35,935	8,396	7,346	6,817	5,254	71.5	77.1
CY1950-FY1961	71,739	14,260	13,535	12,781	9,745	72.0	76.2
FY1962-69	95,797	22,045	21,153	19,643	14,720	69.6	74.9
FY1970-72	55,208	10,461	10,296	9,588	7,267	70.6	75.8
FY1973-74	36,519	6,983	6,977	6,343	4,796	68.7	75.6
Unknown	772	326	301	240	123	40.9	51.3
Ph.D. Institution							
U.S.	283,630	57,2[illegible]	54,662	51,260	38,901	71.2	75.9
Foreign	12,340	5,1[illegible]	4,946	4,152	3,004	60.7	72.4
Sex							
Male	268,041	49,869	47,615	44,372	33,589	70.5	75.7
Female	27,929	12,602	11,993	11,040	8,316	69.3	75.3
Race/Ethnic Group							
Minority Group***	3,596	1,780	1,778	1,595	1,056	59.4	66.2
White/Unknown	292,374	60,691	57,830	53,817	40,849	70.6	75.9

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering. Hence, these figures exceed the population estimates shown in Table 1.12 on page 31 of this report.

\+ The survey sample is the sample size minus persons known to be deceased or out-of-scope prior to the 1975 survey. The out-of-scope classification is assigned to an individual who indicated in a pervious survey that he or she:
a) holds a doctorate in education or a professional field and works in a nonscience/nonengineering position, or
b) holds a Ph.D. degree from a foreign institution, is a foreign citizen, and resides in a foreign country.

\# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1975 survey and persons residing in foreign countries in 1975.

++ Response rate "A" is the number of 1975 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1975 survey responses divided by the number assumed to have been contacted.

Individuals who earned doctorates in science and engineering were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

***Includes only those individuals whose race or ethnic group was known at the time the sample was selected.

TABLE C.3 Response Rates for the 1973 Survey of Doctorate Recipients in Science and Engineering

	Sampling Frame* (N)	Sample (N)	Survey Sample+ (N)	Contacted# (N)	Survey Responses** (N)	Response Rates++ A (%)	Response Rates++ B (%)
Total	261,393	56,096	54,987	51,813	41,024	74.6	79.2
Field of Doctorate/Employment##							
Mathematics/Computer Sciences	15,430	4,199	4,140	3,956	3,041	73.5	76.9
Physics/Astronomy	24,136	4,967	4,896	4,643	3,602	73.6	77.6
Chemistry	42,724	7,765	7,605	7,198	5,799	76.3	80.6
Earth Sciences	8,117	1,889	1,836	1,753	1,468	80.0	83.7
Engineering	36,657	5,987	5,922	5,620	4,426	74.7	78.8
Life Sciences (Agricultural, Medical and Biological)	65,306	16,333	15,979	14,822	12,051	75.4	81.3
Psychology	30,501	6,956	6,829	6,485	5,036	73.7	77.7
Social Sciences	37,581	7,402	7,187	6,784	5,149	71.6	75.9
Unknown	941	598	593	552	452	76 2	81.9
Year of Doctorate							
CY1930-49	38,851	9,112	8,324	7,581	5,983	71.9	78.9
CY1950-FY1961	71,489	14,260	14,033	13,294	10,540	75.1	79.3
FY1962-69	95,438	22,042	21,953	20,710	16,253	74.0	78.5
FY1970-72	55,103	10,356	10,351	9,954	8,078	78.0	81.2
Unknown	512	326	326	274	170	52.1	62.0
Ph.D. Institution							
U.S.	249,979	50,934	49,825	47,378	37,615	75.5	79.4
Foreign	11,414	5,162	5,162	4,435	3,409	66.0	76.9
Sex							
Male	238,433	45,260	44,430	41,972	33,338	75.0	79.4
Female	22,955	10,836	10,557	9,841	7,686	72.8	78.1

* The sampling frame includes those deceased, those residing in foreign countries, and those with doctorates in education or professional fields who were working in science or engineering. Hence, these figures exceed the population estimates shown in Table 1.12 on page 31 of this report.

\+ The survey sample is the sample size minus persons known to be deceased prior to the 1973 survey.

\# The number assumed contacted equals the survey sample minus those individuals for whom no valid addresses could be obtained.

** Responses include individuals found to be deceased in the 1973 survey and persons residing in foreign countries in 1973.

++ Response rate "A" is the number of 1973 survey responses divided by the number in the survey sample. Response rate "B" is the number of 1973 survey responses divided by the number assumed to have been contacted.

Individuals who earned doctorates in science and engineering were stratified by field of degree. Those with doctorates in education or professional fields who were identified as working in science or engineering were stratified by field of employment.

Note: Race/ethnic group data are available from the NRC's Doctorate Record File beginning with FY 1973 Ph.D. recipients. Therefore, pre-1973 survey information on this variable was not available at the time the sample was selected.

APPENDIX D

WEIGHTING PROCEDURE

Estimates in this report are based on weighted responses. The 4,171 individuals in the total sample of 83,546 who were known to be deceased or out-of-scope prior to the survey were excluded from the survey and weighted by their sample weight. The responses received from the survey sample (50,648) were assigned a response weight that is the product of the weight for non-response and the sample weight. Table D.1 shows the classification of the sample and the formulas used for calculating the weights.

Each stratum with fewer than two responses was merged with a similarly defined stratum in order to calculate sampling errors. Respondents in each stratum were assigned a weight equal to the integral part of the stratum's response weight, or the integral part plus one. Allocation of weights within a stratum was made at random so as to represent the stratum population. This technique avoids the necessity of rounding fractional estimates of totals.

For example, consider a stratum which contains 60 individuals of whom 15 were selected for the sample. One of the 15 is known to be deceased prior to the survey. This individual receives a sample weight, 60/15, or 4.0, and thus represents 4 individuals in the population. The number of survey sample cases in the stratum is 14. Of these 14 individuals, 10 responded. The average weight for the respondents in this stratum would be [60/15] [14/10] = 5.6. To obtain integer weights, 4 of the respondents, chosen at random, would each receive a weight of 5, thus representing 20 individuals in the population. The 6 remaining respondents would each receive a weight of 6, thus representing 36. Combined, the 10 respondents would represent 56 individuals in the stratum, who together with the 4 individuals who are estimated to be deceased represent the entire 60 individuals in the stratum.

TABLE D.1 Classification of Sample and Weighting for 1977 Survey of Doctorate Recipients

Group		Number in Sample	Type of Estimation Weight*
TOTAL SAMPLE		83,546	
EXCLUDED FROM SURVEY			
Known Deceased Prior to 1977 Survey**	2,505		Sample
Out-of-Scope			
Foreigns: Out-of-Scope, Based on 1973 Survey Responses+	135		Sample
Fields: Out-of-Scope, Based on 1973 Survey Responses#	1,186		Sample
Fields: Out-of-Scope, Based on 1975 Survey Responses#	345		Sample
Total		4,171	
SURVEY SAMPLE		79,375	
Unable to Mail, No Valid Address		5,611	
CONTACTED SAMPLE		73,698	
RESPONSES			
Good Responses	50,352		Response
Known Deceased as a Result of the 1977 Survey	296		Response
Total		50,648	

* The sample weights (Ws) and response weights (Wr) for each stratum were computed as follows:

$$Ws_h = \frac{N_h}{n_h}$$, where N_h and n_h are the respective population and sample sizes of the stratum (h).

$$Wr_h = \frac{N_h}{n_h} \cdot \frac{\hat{n}_h}{r_h}$$, where $\hat{n}_h$ is the number of survey sample cases in the stratum and r_h is the number of survey responses in that stratum.

** Based on data obtained through 1973 or 1975 survey responses or through address searches.

\+ Based on responses that indicated individuals held Ph.D.'s from foreign institutions, were foreign citizens, and resided in foreign countries

\# Based on responses that indicated individuals held doctorates in education or professional fields and were employed in nonscience/nonengineering positions.

APPENDIX E

SAMPLING ERROR

SAMPLING ERROR ESTIMATES FOR RATIOS

Most of the statistics presented in this report are ratios of two weighted sums of observations, i.e., ratios of random variables. Thus, for example, we are concerned with a ratio, $r = y/x$, where

$$y = \sum_h \left[N_h/n_h\right] \sum_i y_{hi}$$

$$x = \sum_h \left[N_h/n_h\right] \sum_i x_{hi}$$

and where y_{hi} and x_{hi} are observations made on the i^{th} response of stratum h, N_h is the number of individuals in the active population of stratum h, and n_h is the number of responses from stratum h.

The estimates of sampling error in this report are computed as if the responses obtained for a stratum are a random sample from that stratum. Strata were combined whenever the number of responses in a stratum was less than two.

The variance of the ratio y/x is estimated by the expression

$$s_r^2 = \left(\frac{y}{x}\right)^2 \left(\frac{s_y^2}{y^2} + \frac{s_x^2}{x^2} - \frac{2s_{xy}}{xy}\right)$$

where

$$s_{xy} = \sum_h \frac{N_h^2}{n_h} \frac{N_h - n_h}{N_h - 1} \frac{1}{n_h - 1} \left(\sum_i \left[x_{hi} - \bar{x}_h\right]\left[y_{hi} - \bar{y}_h\right]\right),$$

$\bar{x}_h$ and $\bar{y}_h$ being the means of the x and y values observed in stratum h, respectively. Similarly, s_x^2 and s_y^2 are defined using $\left[x_{hi} - \bar{x}_h\right]^2$ and $\left[y_{hi} - \bar{y}_h\right]^2$ in the inner summation.

Some of the statistics in the report are differences between two estimated ratios in percentage form, e.g., the difference between the percentage of

engineers employed by business or industry in 1977 and the corresponding percentage for 1975. If we write the difference as

$$r_1 - r_2 = \frac{y_1}{x_1} - \frac{y_2}{x_2} \ ,$$

the variance is estimated by

$$s^2_{r_1-r_2} = s^2_{r_1} + s^2_{r_2} - 2s_{r_1r_2} \ .$$

The terms $s^2_{r_1}$ and $s^2_{r_2}$ are estimated variances of ratios, calculated as given above, and $s_{r_1r_2}$ is estimated by

$$s_{r_1r_2} = r_1r_2 \left(\frac{s_{y_1y_2}}{y_1y_2} + \frac{s_{x_1x_2}}{x_1x_2} - \frac{s_{x_1y_2}}{x_1y_2} - \frac{s_{x_2y_1}}{x_2y_1} \right)$$

where, for example,

$$s_{y_1y_2} = \sum_h \hat{n}_h \frac{N_{1h}N_{2h}}{n_{1h}n_{2h}} \frac{1}{\hat{n}_h - 1} \left(\sum_i \left[y_{1hi} - \bar{y}_{1h} \right] \left[y_{2hi} - \bar{y}_{2h} \right] \right)$$

and the other covariances are written in similar fashion. In these expressions, $\hat{n}_h$ is the number of responses in stratum h that are common to the estimates y_1 and y_2; thus, strata may be combined as necessary to ensure that $\hat{n}_h$ is greater than one.

The standard errors presented in the text are the square roots of the variances described above.

Comparisons can be made between sampling errors computed on the basis of a simple random sample (srs) and those which take into account stratification. Table E.1 presents sampling errors associated with selected statistics from the report. Bases of various sample sizes and a range of statistic values have been chosen to provide representative comparisons. Sampling errors in the column s_p were computed with the expression $\left(\frac{p[1-p]}{n} \right)^{\frac{1}{2}}$, while those under s_r were calculated with the formula described above, which takes into account the sample design. The statistics are in percentage form and are the estimated

TABLE E.1 Comparison of Sampling Errors for Selected Statistics

Variable Base and Subcategory	Sample Size of Variable Base	Statistic (%)	s_p (%) (srs)	s_r (%) (Stratified)
1. Science/Engineering				
Field of Ph.D.--Total Engineering Ph.D.	37,488	15.0	0.2	0.1
Field of Employment--Total Employed Employed in Mathematics	34,599	4.7	0.1	0.1
Physics/Astronomy Ph.D.--Total Employed Employed in Physics/Astronomy	3,097	61.8	0.9	0.9
Biological Science Ph.D.--Total Female	8,895	16.9	0.4	0.1
Earth Science Ph.D.--Total Employed Part-Time	1,382	2.0	0.4	0.4
Computer Science Ph.D.--Total Full- or Part-Time Employed Employed in Business or Industry	636	53.9	2.0	2.1
Chemistry Ph.D. (FY 1971-1976 Graduates)--Total Full- or Part-Time Employed Employed in Teaching	992	22.6	1.3	1.4
1960-1969 Ph.D. Recipients (Male)--Total Academically Employed Hold Rank of Professor	6,364	42.8	0.6	0.6
Labor Force--Total Unemployed, Seeking Employment	35,115	1.2	0.1	0.1
Labor Force--Total Social Science Ph.D. Employed Full-Time	4,366	94.3	0.4	0.4
Labor Force--Total Male Unemployed, Seeking Employment	28,199	0.9	0.1	0.1
Labor Force--Medical Science Ph.D./Female Employed Full-Time	304	79.6	2.3	2.3
2. Humanities/Selected Social Sciences				
Field of Ph.D.--Total History Ph.D.	10,276	21.8	0.4	0.1
Field of Employment--Total Employed Employed in Music	9,048	4.4	0.2	0.1
History Ph.D.--Total Employed Employed in Social Sciences	1,550	3.3	0.5	0.5
Philosophy Ph.D.--Total Female	682	13.5	1.3	0.4
Modern Language Ph.D.--Total Employed Full-Time	2,191	78.6	0.9	0.8
Art History Ph.D.--Total Full- or Part-Time Employed Employed in 4-Year College/University	315	88.3	1.8	2.0
Speech Ph.D. (FY 1971-1976 Graduates)--Total Full- or Part-Time Employed Employed in Management/Administration	108	6.1	2.3	2.7
1950-1959 Ph.D. Recipients (Male)--Total Academically Employed Hold Rank of Professor	928	87.0	1.1	1.1
Labor Force--Total Unemployed, Seeking Employment	9,366	2.9	0.2	0.2
Labor Force--Total Music Ph.D. Employed Full-Time	548	90.3	1.3	1.2
Labor Force--Classical Languages and Literature Ph.D., Male Employed Full-Time	211	94.3	1.6	1.6
Labor Force--Total Female Unemployed, Seeking Employment	3,025	6.8	0.5	0.5

proportion of a variable category with a given characteristic, $\frac{1}{n}\sum_{i}^{n} y_i$ (for the purposes of s_p), or the ratio of two random variables, $\frac{y}{x}$ (for the purposes of s_r).

For the most part, differences between the two error estimates are small. Calculations based on an srs are for most statistics the same as or slightly higher than those which take account of the stratification. For statistics which are ratios of two stratifying variables (e.g., the ratio of women philosophy Ph.D.'s to total philosophy Ph.D.'s), the estimate of sampling error is much higher using the formula for s_p. In certain cases (mainly those involving estimates of type of employer or primary work activity for small subgroups), the use of the formula for an srs appears to underestimate the sampling error.

Taking these potential discrepancies into account, a useful approximation of the sampling errors of those statistics presented in this report in percentage form can be obtained from Table E.2. This table summarizes sampling errors associated with various proportion values at given sample sizes. Calculations in the table assume a simple random sample.

TABLE E.2 Approximate Sampling Errors for Various Statistics and Sample Sizes

Sample Size	Proportion				
	0.01 or 0.99	0.05 or 0.95	0.10 or 0.90	0.25 or 0.75	0.50
37,500	0.00051	0.00113	0.00155	0.00224	0.00258
12,100	0.00090	0.00198	0.00273	0.00394	0.00455
10,300	0.00098	0.00215	0.00296	0.00427	0.00493
9,000	0.00105	0.00230	0.00316	0.00456	0.00527
4,300	0.00152	0.00332	0.00457	0.00660	0.00762
2,400	0.00203	0.00445	0.00612	0.00884	0.01021
1,200	0.00287	0.00629	0.00866	0.01250	0.01443
800	0.00352	0.00771	0.01061	0.01531	0.01768
400	0.00497	0.01090	0.01500	0.02165	0.02500
200	0.00704	0.01541	0.02121	0.03062	0.03536
100	0.00995	0.02179	0.03000	0.04330	0.05000

Values for Table E.2 were computed using the formula $s_p = \left(\frac{p[1-p]}{n}\right)^{\frac{1}{2}}$, in which p is the proportion of a particular category (variable) possessing a certain characteristic, y $\left(\text{i.e., } p = \frac{1}{n}\sum_{i}^{n} y_i\right)$, and n is the number of sample cases in the variable-specified category (e.g., doctoral scientists and engineers in the U.S. labor force). The finite population correction factor, fpc = $\left([N-n] / [N-1]\right)^{\frac{1}{2}}$, has been omitted from the calculations, since the fpc has negligible effect on most statistics in this report, unless the estimate applies to a subgroup that has a high sampling rate. In any case, the omission of the fpc in the formula for s_p yields a conservative estimate (i.e., a higher estimate) of the sampling error.

The estimated populations for particular variables are provided in this report. The sample sizes can be estimated by multiplying the population by the weighting fraction, which is the sampling fraction corrected for non-response. The mean weighting fractions for selected groups are:

	Science/ Engineering	Humanities/Selected Social Sciences
TOTAL IN U.S.	0.127	0.130
Men	0.112	0.111
Women	0.254	0.198
Minority Racial Group	0.166	0.300

Example: In Table 1.5A, the total employed population of doctoral scientists and engineers is 267,206. Multiplying by 0.127, the approximate sample size is 33,935. The sampling error of a reported statistic (for instance, employed in business or industry, 26.4 percent) can be estimated using the formula for s_p or consulting Table E.2 using rough approximations of the sample size and percentage in proportion form. In this case, $s_p = \left(\frac{0.264 \cdot [1-0.264]}{33,935}\right)^{\frac{1}{2}} = 0.00239$, or 0.2 percent. Similarly, the value in the table opposite 37,500 for 0.25 is 0.00224. The reader can construct the desired confidence interval by multiplying the standard error by the appropriate coefficient: $\pm 1\ s_p$ will provide a 66.7 percent confidence interval, $\pm 2\ s_p$ approximately a 95 percent interval, etc.

SAMPLING ERROR ESTIMATES FOR MEDIANS*

Sampling errors for median salary estimates presented in this report were computed not by strata but for all observations n, the number of sample cases in a particular subgroup reporting a salary. Comparisons of sampling errors for ratios and proportions (see above) indicate only minor differences between those calculated by strata and those that do not fully take into account sample design. The reader should interpret the confidence intervals as close approximations.

From the estimated population distributioh, a statistic, m, is computed that is an estimator of M, the position measure. When m is a median (p_m), the proportion of cases in the derived distribution falling below the position measure equals 0.5. The sampling error of p_m is estimated by the formula $s_{p_m} = \left(\frac{p_m[1-p_m]}{n}\right)^{\frac{1}{2}}$. Two additional proportions are then computed:

$$p_1 = p_m - ks_{p_m}$$

$$p_2 = p_m + ks_{p_m}$$

The confidence interval for the median is set by calculating m_1 and m_2, the values below which p_1 and p_2 of the population distribution fall. The level of confidence is determined by k and will be 66.7 percent when k = 1, approximately 95 percent when k = 2, etc. Because the values of m_1 and m_2 depend on the variability of the distribution, the reader is cautioned that corresponding values for 2 standard errors are not necessarily twice those for 1 standard error. Confidence intervals in the text were calculated for 1 standard error.

Example: In Table 1.8 an estimated median annual salary of $28,500 is reported for Ph.D. engineers. This was computed on the basis of 3,833 sample observations. Therefore, $s_{p_m} = \left(\frac{0.5[1-0.5]}{3,833}\right)^{\frac{1}{2}} = 0.00808$. To construct a 95

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* The method for determining sampling errors of medians in this report was adapted from Morris H. Hansen, William N. Hurwitz, and William G. Madow, Sample Survey Methods and Theory, vol. 1 (John Wiley & Sons, Inc., New York, 1953), pp. 448-449.

percent confidence interval, compute $p_1 = 0.5 - 2[0.00808] = 0.48384$ and $p_2 = 0.5 + 2[0.00808] = 0.51616$, which round to 0.48 and 0.52. The values $m_1 = \$28,200$ and $m_2 = \$28,800$ are then calculated, resulting in the interval \$28,200 to \$28,800. When rounded to hundreds of dollars, the confidence interval will in most cases be symmetric about the estimate, as in this example--\$28,500 ± \$300.

APPENDIX F

FINE FIELDS OF EMPLOYMENT

FINE FIELDS OF EMPLOYMENT OF DOCTORAL SCIENTISTS AND ENGINEERS IN THE UNITED STATES, 1977

1977 Fine Field of Employment	Est. N
Total Population	295,827
Mathematics Total	13,730
Algebra	1,223
Analysis & Functional Anal.	1,806
Geometry	244
Logic	208
Number Theory	330
Probability	364
Math. Statistics	1,624
Topology	1,031
Operations Research[1]	952
Applied Mathematics	1,932
Combinatories & Finite Math	300
Physical Mathematics	163
Mathematics, General	2,589
Mathematics, Other	364
Computer Sciences Total	5,5[illegible]
Theory	31[illegible]
Software Systems	3,23[illegible]
Hardware Systems	53[illegible]
Intelligent Systems	357
Computer Sciences, Other	1,071
Physics & Astronomy Total	17,911
Astronomy	856
Astrophysics	1,291
Atomic & Molecular Physics	1,335
Electromagnetism	390
Mechanics	67
Acoustics	534
Fluids	336
Plastic Physics	1,137
Optics	1,121
Thermal Physics	183
Elementary Particles	1,481
Nuclear Structure	1,040
Solid State	3,053
Physics, General	3,066
Physics, Other	2,021
Chemistry Total	33,236
Analytical	3,954
Inorganic	1,722
Synth. Inorg. Organomet.	614
Organic	5,754
Synth. Org. & Nat. Prod.	2,156
Nuclear	457
Physical	3,722
Quantum	161
Theoretical	236
Structural	302
Agriculture & Food	715
Thermodyn. & Materl. Prop.	438
Pharmaceutical	1,277
Polymers	4,391
Biochemistry[2]	2,358
Chemical Dynamics	441
Chemistry, General	1,907
Chemistry, Other	2,631
Earth, Environmental Marine Sciences Total	12,511
Mineralogy, Petrology	831
Geochemistry	623
Stratigraphy, Sedimen.	722
Paleontology	566
Structural Geology	245
Geophysics (Sol. Earth)	1,077
Geomorph., Glacial Geol.	268
Applied Geol., Geol. Engr. Econ. Geol.	1,094
Fuel Tech. & Petrol. Engr.[3]	148
Hydrology & Water Resources	746
Oceanography	936
Marine Sciences, Other	597
Atmospheric Physics & Chem.	779
Atmospheric Dynamics	266
Atmospheric Sciences, Other	627
Environmental, General	1,383
Environmental, Other	647
Earth Sciences, General	508
Earth Sciences, Other	448
Engineering Total	42,309
Aero- & Astronautical	1,864
Agricultural	661
Biomedical	1,063
Civil	2,529
Chemical	5,105
Ceramic	481
Electrical	3,917
Electronics	3,898
Industrial & Manufacturing	869
Nuclear	1,728
Engineering Mechanics	1,881
Engineering Physics	1,200
Mechanical	4,284
Metallurgy & Phys. Met.	2,351
Systems Design/Science	2,341
Operations Research[4]	1,076
Fuel Tech. & Petrol. Engr.[5]	767
Sanitary & Environmental	1,294
Mining	172
Materials Science Engr.	2,175
Engineering, General	737
Engineering, Other	1,916
Agricultural Sciences Total	13,534
Agronomy	1,660
Agricultural Economics	2,098
Animal Husbandry	478
Fish & Wildlife	624
Forestry	1,145
Horticulture	1,266
Soils & Soil Science	1,075
Animal Science & Animal Nutrition	1,499
Phytopathology	1,238
Food Science & Technology[6]	892
Agriculture, General	542
Agriculture, Other	1,017
Medical Sciences Total	14,785
Medicine & Surgery	1,961
Public Health, Epidemiology	1,101
Veterinary Medicine	890
Hospital Administration	270
Nursing	461
Parasitology	382
Environmental Health	605
Pathology	928
Pharmacology	2,931
Pharmacy	985
Medical Sciences, General	875
Medical Sciences, Other	3,396
Biological Sciences Total	39,251
Biochemistry[7]	6,055
Biophysics	1,232
Biomathematics	79
Biometrics, Biostatistics	1,017
Anatomy	1,760
Cytology	954
Embryology	551
Immunology	1,804
Botany	1,546
Ecology	2,043
Hydrobiology	244
Microbiology & Bacteriology	3,982
Physiology, Animal	3,894
Physiology, Plant	1,010
Zoology	1,878
Genetics	2,179
Entomology	1,877
Molecular Biology	2,122
Food Science & Technology[8]	554
Behavior/Ethology	309
Nutrition & Dietetics	588
Biological Sciences, General	1,805
Biological Sciences, Other	1,768
Psychology Total	28,555
Clinical	12,397
Counseling & Guidance	1,559
Developmental & Gerontol.	1,552
Education	942
School Psychology	787
Experimental	2,884
Comparative	215
Physiological	963
Inudstrial & Personnel	1,772
Personality	408
Psychometrics	521
Social	1,654
Psychology, General	1,170
Psychology, Other	1,731
Social Sciences Total	32,973
Anthropology	2,368
Archeology	492
Communications	1,240
Linguistics	875
Sociology	5,962
Economics	8,018
Econometrics	712
Social Statistics	465
Geography	1,761
Area Studies	250
Political Science	5,778
Public Administration	1,613
International Relations	1,043
Urban & Regional Planning	704
History & Phil. of Science	244
Social Sciences, General	457
Social Sciences, Other	991
Humanities Total	794
History & Criticism of Art	86
History	254
Speech as a Dramatic Art	40
Philosophy	83
Languages & Literature	656
Humanities, General	59
Humanities, Other	89
Library & Archival Sciences	183
Education & Other Fields Total	15,715
Education	6,161
Art, Applied	55
Religion & Theology	331
Business Administration	3,865
Home Economics	128
Journalism	242
Speech & Hearing Sciences	105
Law, Jurisprudence	579
Social Work	172
Professional Field, Other	411
Other Fields	3,666
No Report	6,036
Not Employed	18,917

[1]See also Engineering-Operations Research.
[2]See also Biological Science-Biochemistry.
[3]See also Engineering-Fuel Tech. & Petrol. Engr.
[4]See also Mathematics-Operations Research.
[5]See also Earth Sciences-Fuel Tech. & Petrol. Engr.
[6]See also Biological Sciences-Food Science & Technology.
[7]See also Chemistry-Biochemistry.
[8]See also Agricultural Sciences-Food Science & Technology.

FINE FIELDS OF EMPLOYMENT OF PH.D.'S IN THE HUMANITIES
AND SELECTED SOCIAL SCIENCES IN THE UNITED STATES, 1977

1977 Fine Field of Employment	Est. N
Total Population	79,174
Mathematics Total	106
Logic	46
Mathematics, Other	60
Computer Sciences Total	159
Software Systems	83
Computer Sciences, Other	76
Chemistry and Earth Sciences Total	39
Engineering Total	129
Agricultural Sciences Total	97
Medical and Biological Sciences Total	228
Psychology Total	335
Clinical	53
Counseling & Guidance	148
Industrial & Personnel	47
Psychology, Other	87
Social Sciences Total	12,623
Anthropology	134
Archeology	172
Communications	890
Linguistics	1,040
Sociology	222
Economics & Econometrics	134
Social Statistics	42
Geography	46
Area Studies	306
Political Science	5,813
Public Administration	1,439
International Relations	1,150
Urban & Regional Planning	219
History & Philosophy of Science	333
Social Sciences, General	262
Social Sciences, Other	421

1977 Fine Field of Employment	Est. N
Humanities Total	24,919
History & Criticism of Art	1,371
History, American	5,577
History, European	3,537
History, Other	2,171
American Studies	476
Music	3,133
Speech as a Dramatic Art	1,711
Philosophy	3,803
Comparative Literature	709
Humanities, General	809
Humanities, Other	528
Library & Archival Sciences	1,094
Languages & Literature Total	22,080
American	3,522
English	9,750
German	1,631
Russian	593
French	2,286
Spanish & Portuguese	2,353
Italian	172
Classical	998
Other Languages	775
Education & Other Fields Total	7,578
Education	3,364
Art, Applied	69
Religion	635
Theology	364
Business Administration	644
Journalism	438
Speech & Hearing Sciences	315
Law, Jurisprudence	320
Social Work	111
Professional Field, Other	214
Other Fields	1,104
No Report	2,644
Not Employed	8,237